

University News

MONDAY, AUGUST 23, 1993

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AIU Standing Committee Meeting Bombay, 28 August 1993



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Editor :
SUTINDER SINGH

The Bombay University A Profile

S.D. Karnik*

This issue of *University News* puts the spotlight on the
University of Bombay – the hosts to AIU Standing
Committee being held on 28 August 1993.

The University of Bombay is one of the oldest and premier universities in India established in 1857 consequent upon 'Wood's Education Despatch'. The universities of Madras and Calcutta were also established in the same year.

The profile of the Bombay University built in 137 years holds out its glorious existence with milestones of achievements as the intellectual and moral power house of the society. It is a grand account of the endeavours of the University to give off its best to the country and the city of Bombay by shouldering ever growing load of responsibilities and challenges generated by political upheavals and changing socio-economic values.

The first and foremost clarion call given to the first eight graduates of this University on 28th April, 1862 by Sir Bartle Frere, the then Governor of Bombay and Chancellor of the University of Bombay, exhorted them to restore the pristine vigour to a society plagued by disorder and intellectual stagnation. Indeed it was a massive task to awaken the society that was sleeping in the dark. Shri Mahadev Govind Ranade, often called 'Prince among the graduates' had the honour of inaugurating the distinguished infinite stream of the graduates to contribute their mite for the wellbeing of the Nation.

In 1863 the doors of the University were laid open to female candidates who were thus far denied enlightenment through education. Our University thus began auspiciously and the Government offered the present site of Fort Campus in April, 1869. Gilbert Scott in London prepared designs and drawings for the University Senate Hall and Library with Tower. Built in the free variety of 13th Century Gothic structure the Senate Hall and the Library with Tower represent a marvel of architecture. The Senate Hall, is also the Convocation Hall. It is named after its donor, Sir Cowasjee Jehangir. Few universities in the world can boast of a Convocation Hall of this grandeur which was completed in 1874. The Library and Tower with exquisite architectural beauty were completed in 1878. The university buildings with North and South Wings were constructed later on when plans were prepared in 1916. During 1922-23 the University got its present building at the Fort Campus.

The Indian Universities Act, 1904, enabled Bombay University to exercise greater control over teaching in colleges through provisions of the conditions of affiliation and periodic inspection, reports and returns.

The Bombay University Act, 1928, continued more or less with the same conditions, except that it empowered the Syndicate to issue instructions from time to time regarding teachers and teaching programmes. The period between 1928-53 is noted for the establishment of

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University Department of Chemical Technology, Press, New Chairs, and acquisition of new buildings for the multifarious activities of the University.

The independence of the country resulted into shrinkage of the jurisdiction and therefore Bombay University Re-organisation Committee was appointed under the Chairmanship of Justice N.H. Bhagwati to suggest measures for the reorganisation of the University Management. The Committee submitted its report in 1950. The passing of the University of Bombay Act, 1953 was the culmination of a series of deliberations both at the University and Government level.

The 1953 Act came into force on the 1st June, 1953. The Act brought in a successful transformation in the constitution, functions and powers of the University. It redefined the relationship between the University and its colleges.

The emergence of a city University was, in a way a boon for what in the Twenties seemed a distant dream. The greatest advantage of the Bombay University Act, 1953 was that the long cherished dreams of the University authorities to make the University a 'teaching' one was realised. The University was soon to establish one Department after another.

The Department of Chemical Technology had already given lead since 1934 in this direction. University education in the country was to be metamorphosed and equipped to fulfil the needs of the national milieu.

The Bombay University was now required to gear itself for unprecedented challenges of supplying manpower and experts to fast developing independent India.

By 1966, the University acquired Government land for the Vidyanagari Campus admeasuring 231 acres. The ambitious Master Plan developed a land use pattern based on the projected growth of the University. The campus has been developing slowly in phases of limited growth. The first building viz. Science building was ready for occupation by June, 1971, and the first group of departments -- Statistics, Geography and Physics started functioning from the Vidyanagari Campus. In the course of time a few more departments -- Chemistry, Mathematics, Economics, Sociology, Civics & Politics and Applied Psychology started functioning. The Western Regional Centre of the Indian Council of Social Sciences Research was also set up. The Library building was ready in 1976 and Jawaharlal Nehru Library

started functioning in full stream in the campus. The Western Regional Instrumentation Centre (WRIC) set up by the UGC under the auspices of the Bombay University got its new building in 1980 at the Vidyanagari Campus.

The constant increase in the responsibilities of the University needed constitution of additional infrastructure than that provided by the 1953 Act. Further, with the advent of other universities in the state, there was a need for providing uniform legislation for the governance of various universities in the state of Maharashtra. Accordingly, the Maharashtra Universities Act, 1974 was passed.

The Bombay University Act, 1974 which came into force on 20th May, 1974 consolidates and amends the law relating to the University of Bombay. It was passed for the 'better governance of universities and re-organisation of higher education'. The Governor of Maharashtra is the Chancellor of the University. This University Act is aimed to provide the framework for achieving the ideals of the system and not merely create an audit-oriented administrative mechanism. The 1974 Act devotes a separate chapter to a variety of committees to satisfy objectives and to make higher education develop wider perspective of total development of the personality of students. Committees for library, academic planning and evaluation, finance and accounts are intended to streamline educational administration to a higher degree of efficiency and more effective financial control.

The profile of the Bombay University, under the 1974 Act, acquired a new dimension of growth and development with its in-built resilient strength of strong foundations. The geographical jurisdiction was once again extended by the 1974 Act.

The statistical profile of the University for the year 1991-92 is presented herein to offer a glimpse of the magnitude of responsibilities that this grand University is shouldering.

<i>Jurisdiction</i>	: Districts of Greater Bombay, Thane, Raigad, Ratnagiri and Sindhudurg.
<i>Location</i>	: Fort, Matunga & Kalina Campuses and several buildings outside these campuses.
<i>University Departments</i>	: 35
<i>– Student Enrolment</i>	: 7,084
<i>Colleges Affiliated</i>	: 232
<i>– Student Enrolment</i>	: 2,04,439

Recognised Institutions	:	66
— Student Enrolment	:	3,579
Institute of Distance Education		
— Student Enrolment	:	19,034
Garware Institute of Career Education & Development		
— Student Enrolment	:	324
Number of Examinations Conducted	:	683
Students appeared in the Examination	:	1,69,465
Overseas Students	:	422

Libraries—Special

Department of Chemical Technology
Jamnalal Bajaj Institute of Management Studies

Two Main Libraries :

Fort Campus and Kalina Campus (Jawaharlal Nehru Library)

— Readers Served	:	1,180 Fort 5,800 JNL
— Books & Periodicals used by Readers	:	42,990 Fort 1,53,012 JNL
— Postgraduate Students registered with the libraries	:	292 Fort 1,796 JNL
— Other Readers	:	2,684 Fort 2,600 JNL
— Books Lent for Home reading	:	11,323 Fort 41,222 JNL
— Books Purchased (excluding periodicals)	:	553 Fort 3,058 JNL

The University Department of Adult and Continuing Education organises various camps to promote and foster adult education to the masses within the jurisdiction of the University. The Board of Extra-Mural Studies also conducts various courses for the benefit of rural population. Its benevolent programmes are intensified to provide informal, practical education to rural segments.

The Institute of Distance Education caters to the needs of students all over the country, who prefer distance education. The Institute offers courses lead-

ing to the degrees of B.A., B.Com., M.A., M.Com., M.Sc. (Maths), M.Ed., D.F.M., D.O.R.M.

The Department of Students' Welfare is always vibrant with the organisation of co-curricular programmes for the all round development of the personality of the student community. A Students Council is a statutory body under the Bombay University Act, 1974. It is a representative body of students drawn from various faculties, sports, NCC, NSS and cultural activities. The Department of Students' Welfare is focussed on promoting student welfare. It organises a Western Zone Inter-University Competition, Inter-University National Competition, Annual Youth Festival and several programmes for the welfare of the students.

University Employment and Guidance Bureau provides assistance to students seeking part-time employment during vacation time.

The University has an exclusive twelve storeyed hostel building for its overseas students. There are three other boys hostels for University students and one hostel for ladies pursuing postgraduate courses in the various University Departments.

The University has its own Press at the Fort Campus. In the Examination House at Kalina Campus too, we have a Modern Press with Confidential Reprographic and Offset Unit (C.R.O. Unit) and RICO – Printing Machine (Sized A-3).

The administrative scenario has received a close attention with the introduction of Fax in the Examination House and University Office. The examinations' results are announced in time as there is optimum utilisation of Software Computer Unit in processing the results. The photocopying facilities are extended to all the campuses.

The Jamnalal Bajaj Institute of Management Studies, located in an independent building, is a Department with international reputation. It trains talented youth in a variety of management studies in general management, finance, marketing, administration, etc. The Institute has its independent library with most upto-date standard publications, and is actively engaged since its inception (1966) in furthering the cause of the Management Movement of the country through Research, Training and Consultancy.

The Department of Chemical Technology is a very prestigious Department of the University. It has its own premises, a specially designed campus

admeasuring 16 acres to suit its purpose, at Matunga. It has won itself and for the University international recognition through its academic merits. It has its own independent library, laboratory and other equipments. It is also active in scientific exchange programmes with many countries such as the USA. It serves the world of technology and industry by training and equipping their manpower.

With the academic attainments, social and cultural responsibilities of the University are growing. The linkages with the past are always nurtured at the appropriate time to maintain the pristine glory of the University. The University has painted many dreams for modernising the administrative and academic structure to meet the challenges of time. In the absence of substantial private funding, it cannot be denied that the real control in our situation to which the University has to submit is that of the State Government. To facilitate the University to give of its best for the community that is nurturing it, and to generate a healthy environment sensitive to scholarship and values that contribute to character and nation building, the autonomy of the University can bear no conflict with the state.

The Government grant-in-aid system has starved the University completely of any development for it pays only the salaries for the teachers and a limited number of non-teaching staff. The Government has put the entire burden on the University for all the developmental projects, modernisation of its office equipments and infrastructural facilities, updating of libraries and library facilities and so on. Whatever little the University is able to obtain from the University Grants Commission, for development of campuses, lecture complex and the rest, the State Government has blocked that grant because it is unable to commit its matching share.

Despite the manifold challenges confronting the University, sustained endeavours will always ensure the uninhibited development of the University and the upgradation of its high standards.

University Departments

Name of the Department	Year of Establishment	Courses Offered
1 Economics	1921	M.A. M.A. (by Research) M.Phil. Ph.D.
2 Sociology	1919	M.A. M.Phil. Ph.D.

3. Chemical Technology	1934	B.Sc. (Tech.) B.Chem. Engg. B.Pharm. M.Chem. Engg. M.Sc. (Tech.) M.Pharm. M.Sc. (by Research) Ph.D. (Tech) Ph.D. (Science)
4 Statistics	1948	M.A. M.Sc. M.Phil. Ph.D.
5 Civics & Politics	1948	M.A. M.A. (by Research) M.Phil. Ph.D.
6. Applied Psychology	1959	M.A. M.Phil. Ph.D.
7 Law	1959	LL.M. Ph.D.
8 English	1962	M.A. M.Phil. Ph.D.
9 Sanskrit	1963	M.A. Ph.D. Certificate in Sanskrit Diploma in Sanskrit Diploma in Comparative Mythology
10 Mathematics	1963	M.A. M.Sc. M.Phil. Ph.D.
11 J.B. Institute of Management Studies	1964	M.M.S. M.A.M. M.F.M. M.M.M. D.M.M. D.C.M. D.S.M. D.M.S. D.A.M. Ph.D.
12 Library Science	1965	B.Lib. Sc. M.Lib. Sc.
13 Linguistics	1964	M.A. Ph.D.
14 German	1964	M.A. Ph.D. Certificate in German Diploma in German
15 French	1993	M.A. Ph.D. Certificate in French Diploma in French
16. Arabic	1993	M.A. Ph.D. Certificate in Arabic Diploma in Arabic
17 Persian	1993	M.A. Ph.D. Diploma in Persian
18 Chemistry	1966	M.Sc. M.Sc. (by Research) M.Phil. Ph.D.

19. History	1968	M.A. M.Phil. Ph.D.
20. Marathi	1969	M.A. M.Phil. Ph.D. Certificate in Marathi Diploma in Marathi
21. Geography	1969	M.A. M.Phil. Ph.D.
22. Gujarati	1970	M.A. M.Phil. Ph.D.
23. Hindi	1970	M.A. M.Phil. Ph.D.
24. Physics	1971	M.Sc. M.Sc. (by Research) M.Phil. Ph.D.
25. Education	1974	M.Ed. M.Ed. (Part-time) M.Phil. Ph.D.
26. Music	1978	M.F.A. B.F.A. Diploma in Music (HVC) Diploma in Music Sitar (HIC) Diploma in Music Tabla (HIC) Diploma in Music Light (HVL)
27. Computer Science	1978	M.Sc. Ph.D. Diploma in Computer Programming Diploma in Computer Software Techniques Diploma in Computer Science & Application
28. Kannada	1980	M.A. M.Phil. Ph.D. Certificate in Kannada
29. Commerce	1980	M.Com. M.Com. (by Research) M.Phil. Ph.D.
30. Life Science	1981	M.Sc. M.Sc. (by Research) M.Phil. Ph.D.
31. Sindhi	1981	M.A. Ph.D.
32. Urdu	1982	M.A. M.Phil. Ph.D.
33. Philosophy	1986	M.A. M.A. (by Research) M.Phil. Ph.D.
34. Centre of East African Studies	1971	M.A. Ph.D.
35. Centre of Soviet Studies	1972	M.A. Ph.D.



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CONCEPT OF AUTONOMY

With Special Reference to Autonomous Colleges

J.N. Kapur*

Autonomy

Autonomy is government of an organisation by persons most deeply affected by the organisation in the best interest of the organisation, with minimum interference from other agencies.

Thus since a university is a community of teachers, students and researchers, committed to communication and advancement of knowledge, university autonomy is government of a university by these groups for the furtherance of education and research with minimum interference of the government which has to have some control, because it has to see that tax-payers funds are optimally utilised for achieving the goals of the university.

Similarly college autonomy means that the principal, teachers and to some extent, students are in charge of admissions, curriculum, teaching, examinations and appointments, subject to the control of the university which is to see that the standards are maintained and the control of the management which has to see that everything is done in an open and objective manner.

In the same way, we can have autonomy of a university department, or of department of a college, autonomy of a research organisation and ultimately autonomy of a teacher to teach with as much freedom as possible.

The basic philosophy is that a person or group which is free and autonomous is more efficient than a person or a group which is controlled. Of course, the person or the group has to be responsible and accountable for its actions, but there is no interference in the day-to-day functioning of the individual or the group.

The basic philosophy is similar to one which states that a free market economy will lead to greater productivity than a controlled economy and that

democracy leads to greater creativity than the dictatorship.

Some Thoughts on University Autonomy

- i) I seek university autonomy because I believe a university cannot function without it. My motivation is practical. I want autonomy for the university because without autonomy, a university cannot draw the best either from its Vice-Chancellor or from its teachers or from its students or stimulate the best in them.

— V.K.R.V. Rao

- ii) A nice balance has to be kept between two necessities, namely, the necessity of freedom for academic institutions and the necessity that they should serve the nation's needs. Let me first state the position negatively. Autonomy does not mean either independence from social objectives or isolation from social change. A university is not a sovereign body. It comes into existence by legislation and maintains itself and acquires the physical facilities for its functioning largely through the aid of public funds. Every state has the inherent power to see that its universities function as instruments for the service of society; and it has the explicit authority to do so through both its legislative and financial powers. Universities have the obligation to supply the country with the academically trained personnel it requires for its development.

— V.K.R.V. Rao

- iii) Positively, university autonomy relates to the following five main sets of questions :
 - a) The selection and appointment of the senior members of the university — its teachers, researchers, and administrators;
 - b) The selection of its students of various grades;
 - c) The objectives and therefore the patterns of curricular programmes which the students will pursue, and of the standards of attainment to be required for the award of its degrees and diplomas;
 - d) The choice of its research programmes; and

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e) The assessment of the facilities required and the allocation of resources, (i.e. of space, of recurrent income and of capital funds) between different interests, services and activities.

— V.K.R.V. Rao

ii) Society, functioning through government or through intelligent and informed public opinion can indicate what it wants, but it is for the universities and their academic and administrative personnel to decide what should be done in order to meet these wants. It is true that supply has to be adjusted to demand; but it is also true that the supplier must have the freedom to regulate and operate his supplying machinery, if he is to adjust supply to demand. Moreover, in the case of an imponderable commodity like knowledge, demand cannot be the sole arbiter of supply. The supply of knowledge and research has an inner propulsion of its own that quite often outstrips and anticipates demands, and indeed serves to create it. Hence university autonomy and experimentation in courses, syllabuses of study and in research is an essential condition for enabling it to perform a progressive and dynamic role in a progressive society. The university's technical efficiency in meeting felt demands of academic skills is dependent upon its courses of study and methods of teaching, and established standards of evaluation, examination, and academic performance. These, in turn, demand freedom for the university to dispose of its physical and financial resources and control its budget in the manner it thinks fit for the due discharge of its dual function of dissemination and promotion of knowledge. Autonomy of this kind is a functional prerequisite for the university.

— V.K.R.V. Rao

v) Added to this is the unquestionable fact that its presence stimulates and its absence deters the best of men from seeking membership of the university as teachers or scholars or researchers. Hence, my conviction that positive autonomy is of the essence, the flesh, blood and bones of the university structures.

— V.K.R.V. Rao

vi) When I speak of the autonomy of the universities, I do not mean that the universities claim the status of a State within a State. The claim for

autonomy of the universities amounts to a suggestion that political power should not interfere in the academic matters of the universities and should leave the universities to administer their affairs, uninterrupted by an external pull or pressure. The autonomy of the university also means that the executive organs of the university should not impinge upon the free and fearless functioning of its faculties. University autonomy also means that amongst the teachers themselves there must be no question of superior or inferior. Senior teachers must give full liberty and freedom to the junior teachers to express themselves in all academic matters before questions of policy are decided.

— P.B. Gajendragadkar

vii) Lastly, the autonomy of the university postulates that in their search for truth and in the expression of the conclusions, they reach, the members of the faculties and the students should be unafraid of popular prejudices. It is likely that some conclusions which the academics reach might be distasteful to the public mind. But fear of public criticism must not deter the academics from expressing their views openly, clearly and unambiguously.

— P.B. Gajendragadkar

viii) The university community today must start a university movement. It is of the utmost importance for the university community to foster in the mind of the general public faith in certain basic values. For achieving this object, an intellectual dialogue is of utmost importance. The university community must continuously engage itself in an intellectual dialogue with political power on the one hand and with the larger community on the other. The dialogue must be personal, objective, fair and fearless.

— P.B. Gajendragadkar

ix) Did not Nehru say that if the universities discharge their duties satisfactorily, everything will be well with our country? It lies with the university community to fulfil this prophecy of Nehru. The challenge of today is no doubt grim; but if we are determined to meet that challenge, we will certainly be able to meet it. India has a glorious history of five thousand years. Let it not be said about the present

generation that in the hour of peril, the educated men and women of India did not respond to the call of duty.

— P.B. Gajendragadkar

The Role of the Government

Usually university autonomy implies that the government should not interfere in the affairs of the university. However, the government is accountable to the public for the funds that it spends on the university. It has to exercise some control on the universities to see that the funds are properly spent. It can encourage some activities by providing some funds for these and it can discourage some activities by withdrawing funds from them. Thus in most foreign countries government provides funds to universities depending on the number of students permitted in various courses and no university can increase the number of students by itself. The permission for Ph.D programmes is not easily given and no university can start a Ph.D programme on its own. But once a programme is started, the university is completely free to run it the way it likes. The government may itself like some courses to be started and may provide the funds for the same.

In our country, the government does not mind if a university admits double the number of students for which facilities exist, provided no additional funds are asked from the government. Thus the government does not discourage lowering of standards; in fact it encourages it. The government itself starts new colleges and universities without making adequate provisions for them. Every university is automatically permitted to start a Ph.D. programme in any subject whether adequate facilities in the form of qualified staff and laboratory equipment and library books exist or not. Thus while in other countries government control is used to maintain and raise standards, in our country it is used to dilute standards.

Political Interference in the University Autonomy

In our country university autonomy has been threatened much more by political interference than by government interference. The distinction is important. The government interference has to be through open directives to the university, while political interference can be in more subtle ways.

One method of undermining university autonomy is through appointment of 'convenient' persons as Vice-Chancellors. Since the Vice-Chancellor is a key person in the university, the ruling political party can have a great deal of influence in the university through him. However, the opposition knows the affiliation of such a Vice-Chancellor and begins to gun for him from the day he takes office. The result is that the university becomes a political arena where supporters and opponents of the ruling party fight their battles. Teachers and students are also divided into politically motivated groups. When politics enters through one gate of the university, autonomy leaves from the other gate of the university. Peace in the academic campus is disturbed and there is no climate for academic pursuits. University autonomy becomes meaningless under these conditions.

This happens in many universities and this recently happened in Rajasthan University where the Vice-Chancellor was changed in the interest of the political parties and academic activities in the university came to a stand still.

Another method through which the state governments manage to control the universities is by means of making posts of registrars, deputy registrars and even assistant registrars as transferable within the state. These officers of the university run regularly to state secretariats to get their transfers to convenient locations and this gives a lever to the bureaucrats and politicians to manipulate things in the universities. The officers care more for the bureaucrats and the politicians than for the Vice-Chancellors and the academicians. This is apparently done to control the powers of registrars, but essentially it results in transfer of powers from within the university to the political powers. This means complete erosion of the university autonomy.

With these powers, the bureaucrats and the politicians manipulate appointments of professors and readers and sometimes they stoop low enough to manipulate university results and corruption prevails in the university system.

The politicians consider universities as centres of political influence rather than as centres of learning. There can be no university autonomy under these conditions.

This type of political interference is unknown in

Western universities. There political parties compete with one another to see as to which political party can help in building up academic activities on the campuses so that the universities can deliver the goods for the nation and nation is in a position to compete internationally.

In our country, we have started talking of international economic competition and globalisation without realising that without an internationally competitive educational system, all this can make no sense and for that purpose, political interference in the universities will have to be stopped completely forthwith.

University Autonomy and External Examination System

All universities have the autonomy to conduct their examination in the way they like. With almost no exception all affiliated universities have opted for external examination system. One group of senior teachers prepares the syllabus, another group of teachers teaches it and a third group of teachers from outside the university sets and examines the papers. Since the external examiners are not sure what has been taught in different colleges, they set some standard questions and provide plenty of options. The students can leave 30 to 40% of the course and prepare answers for some questions from made-easy books, work for three months in a year and can pass the examinations and get good degrees. No real learning takes place, no thinking takes place and often good books are not taught at all. The universities have given up their own right to examine the way they like.

Once I visited Roorkee University as Chairman of a UGC committee and had a discussion with the entire faculty there. They complained "You at IIT, Kanpur examine your own students and you can teach the way you like, but we at Roorkee have an external examination system". When I asked them whether the external examination system was required in the Act of the university, it became clear that the teachers had themselves imposed the chains of the external examination system on themselves and that they themselves could break these chains by just passing a resolution in the academic council. Some years later they did precisely this and now they have a much better examination system.

External examination system weakens univer-

sity autonomy which includes teacher autonomy and student autonomy. It interferes with the right of the teacher to guide learning process of the students and interferes with the right of the students to meaningful interaction with their teachers. University autonomy is incomplete without teacher autonomy and teacher autonomy is incomplete without internal assessment.

Why College Autonomy?

Today the students in colleges are completely alienated from the educational system. Their main contact with the teachers is as passive listeners to the lectures of the teachers. They have seldom person-to-person discussions. They feel that they can as well study with the help of made-easy books and private tutors and they are not often interested in attending college classes.

We have always praised our ancient *Gurukula* system of education with its close relationship between *Gurus* and *Shishyas*. Today we are farthest from this relationship. In fact students and teachers in the west are following this system much more than we are following. If we want to bring greater contact between students and teachers, internal examination system is necessary and for that college autonomy is a must.

Continuous Internal Assessment

Here the teacher teaches his students. He gives them quizzes almost every week. He also gives regular assignments, mid-semester tests and end-semester tests, he corrects all these either himself or with the help of assistants. All the marked answer books are shown to all the students so that students can see whether the marking is fair. The students can discuss their marks with the teacher so that the teacher is very careful in marking.

The teacher has not only to give absolute marks, but he has to give grades. He has to grade the students in order of merit, so that each student again becomes a watchdog on the fairness of the system. In addition, students give their evaluation of the teachers and courses so that they feel involved in the system.

The teacher keeps a record of topics taught in every lecture. He keeps the records of the quizzes,

assignments and tests, so that everybody can see that the course has been covered in full.

In this system every student has to have the textbook and he has to read the easier parts himself so that the load of the teacher is reduced and his examination load is correspondingly increased. He gets help from senior students in correcting assignments who are paid for this work and who partly support their education through this work.

Autonomous Colleges

The teachers of autonomous colleges have the power and the responsibility to see that

- 1) All admissions are on merit;
- 2) All examinations are fair and objective and there is no secrecy about these;
- 3) Minimum time is spent in conducting the examinations;
- 4) All appointments made in the colleges are fair; and
- 5) The university curriculum is modified (while keeping the same standard) in order to use the expertise of the faculty and the needs of the region.

Kothari Commission had recommended autonomy for colleges and this has recently been supported by the UGC. The UGC has agreed to provide additional funds to autonomous colleges. In spite of this support, the scheme has not made as much progress as it should have, for the following reasons:

1. The state governments are not prepared to give up their powers over the government run colleges;
2. The managements of private colleges are apprehensive that they will lose their powers;
3. The teachers are themselves not fully willing to assume the full responsibilities of autonomy; and
4. There is apprehension that a college degree may not have the same status as a university degree.

The state governments and the college managements have to serve the interest of education rather

than serve their own interest. If everybody works in the interest of the education of the next generation, some of these problems can be solved easily. The basic question that is to be decided is whether we want to produce students who work throughout the year, students who learn how to learn and how to think for themselves, who are self-reliant and who can face problems of modern times, or we want just to produce those who can cram answers to some standard questions and forget them soon afterwards.

Autonomous Institutions Elsewhere

Except in the Indian subcontinent, everywhere in the world all educational institutions including schools, colleges, universities, research institutions are autonomous and all examinations are internal. Universities sometime conduct their own admission tests and employers hold their independent interviews. Students know that these tests and interviews would be fair and do not depend upon the recommendations they get. Therefore, they concentrate on learning rather than on cramming.

There autonomy produces wonderful results. Students work for 50 hours a week for 10 months in a year as against our students who work for 12 weeks in a year. They work 4 to 5 times as hard as students in our country. We cannot afford to waste and we are wasting our resources. They can afford to waste, but they are not wasting any. Their system is full of optimism and full of faith. Our system is characterised by cynicism and lack of faith.

Autonomous colleges offer a way out, but it needs courageous minds to accept the challenge.

Every successful autonomous college will give a new faith to our educational system. Teachers cannot change the whole educational system, but they can work together to change the institution they work in and to run it as they like by getting for it an autonomous status. We hope that more and more college teachers will accept the challenge.

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State Financial Support to Non-Government Colleges

K.K. Bajaj*

In the process of higher education use of substantial amount of scarce national resources is involved. Expenditure on it has acquired greater interest and is a matter of debate in the context of the present day resource crunch, policy of liberalisation, economic reforms and free enterprise. The very impact of higher education with its socio-economic benefits is being debated; its cost is being calculated to correlate it to expenditure and social rewards. All the same if education consolidates human capital and is of paramount importance, how is it that education can not be a purely economic activity, and how is it that it is argued to be accepted as a social responsibility function of the government and is taken only as a marginally promotive and commemorative function by the few influential persons with a politico-academic nexus. In this total context an important question which continues to be discussed is as to who should partially or fully pay for higher education. If the society is its direct beneficiary, then how is an unemployed person who is also a part of it not a beneficiary of this education. If education helps to achieve social mobility and political stability, then it becomes the state function to finance it to ensure its enlarged and equitable access to all, and if it is a state function, then why should it not be a fundamental democratic right and a sole state enterprise. For some education is now a gigantic industry. All these questions and many more make the practice and system of financing of higher education particularly in the collegiate sector a hybrid of central, state and private efforts and make it more complex with benefits becoming substantially diverse and qualitatively uneven in different parts of the country.

In all government, university, constituent or maintained colleges the state governments play the key role in running them. They are more or less government establishments notwithstanding the noticeable variations in academic standards and infrastructure, location and viability, excellence and poverty, financial control and sustenance. But in the

case of privately run colleges the practice of grant-in-aid offers an interesting study because of existing patterns of financing these institutions. By and large, the quantum of support to a non-government college is linked to enrolment, sanctioned staff strength, its revenue, expenditure on miscellaneous items of maintenance and its deficit. In some states the year of establishment of a college and its permanent affiliation to the university are crucial factors and determine grant-in-aid to it. There is so much of diversity in the patterns and procedures being followed in different states that an attempt may be required to be made to homogenise the same. There have been loud complaints about government indifference to these particularly in the matter of support for their maintenance in the absence of waning philanthropic instinct and receding interests of managements to run these. In our complex educational scenario the colleges continue to be encouraged to be opened by private managements because of demographic pressure and regional political compulsions. It is hoped that the college education would improve the quality of life and would help in social gains. Theoretically there is nothing wrong with such a perception but in practice the colleges which have no staff and infrastructure, offer only textbook benefits with replicated obsolete and irrelevant courses, and have no practical utility towards creation of human capital or consolidation of human resource or even in improving the quality of life. In fact a large number of colleges are no institutions for general improvement of our youth and their only function is to offer parking facilities to those who join them without any future assurance. The state governments allow such colleges to be opened as social concessions or in response to certain extraneous compulsions but these colleges never mature into institutions with any sound base and these ultimately characterise a drag on the system.

New Colleges

The approach towards opening new colleges is so ambivalent and arbitrary that the entire exercise looks farcical and at best a formality of sorts. The privately managed colleges thus opened have to

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undergo besides their initial teething problems, their lifelong pangs of survival. Where these offer an interesting history of struggle for existence in the present day context most of these continue to stagger for survival and eventually get turned into social slums. This brings the issue of grant-in-aid centre stage. Financial support is their foremost nagging problem. They have no regenerating financial potential; no resource base, no assets and nothing to fall back upon except looking at the state government for continuously bailing them out through grants-in-aid. But why should any state government wholly or partially pay for a private enterprise howsoever noble it may be. And if at all it has to pay then what should be the extent of such a payment and on what items. If it has to pay partly for the salaries of the staff, then why should it also not pay for the infrastructure and updating of teaching tools. And if it pays for both, then why should higher education not be a state function to be totally financed by it and if this be so, what would be the residual role of private managements in higher education. These are again some of the questions which are linked to the promotive and participatory role of private managements of colleges in the country. Besides this, heterogeneity in financing such institutions among different states and similar types of institutions in the same state, creates difficulties inherent in any discussion on the system.

Educational finance is now shaping into a respectable field of economic enquiry. More so when expansion of higher education is being linked to trends in manpower needs, employment opportunities and general social upliftment. Apart from this various colleges which draw the grant benefits whether partial, substantial or complete, in the country's educational system, demonstrate considerable variation and divergence in the delivery system of these services i.e., quality, tools and benefits of teaching. To further complicate the obtaining picture, there is a strong belief in the country that the local units defy discipline and even healthy state checks. While 'education for all' is emerging as a strong political and social requirement, it is becoming a fountainhead of many a malpractice and exploitation. Where education is considered as a basic function of the government and a social right of the people, to ensure promotion of human values, there is a compelling case for governmental involvement in education particularly in the context of expanding and rapid interest in formation of human capital for the progress and development of a country.

Investment in institutions of higher education is

no doubt beneficial to the entire society and may without injustice be defrayed by the general contribution of the entire society. But the proposition has generated considerable controversy. There is a historical view which Malthus offered while feeling concerned about "population explosion". He regarded education as a worthwhile investment if it could, indeed, provide the "means of inculcating habits which would lead to family limitation". He maintained that education is necessary to assure "civil liberty" and thus "generate prudential habits" (cited in Varzey, 1962; 19). There is a social view, an educationist's view, and then there is an all pervasive democratic and political view that education should continue to be supported as common welfare measure by the state government. The correlation between investment in education, human capital formation, economic development and the well-being of nation is quite well-known. That is why, slogans like education for all, education for democracy, education for equality of opportunity, and of course socio-economic improvement are there. Thus there is always a compelling case for governmental involvement in education which aims at ensuring better future, economic growth, provision of manpower and promotion of common human values.

Once it is accepted that higher education is an instrument of social change and national development the need for a positive government role in promoting it gets established. It is perhaps under this belief that Programme of Action 1992 succinctly stated that there is an urgent need to review, revise and update grant-in-aid rules in the light of recent developments in the field of higher education. This has even observed that the UGC should formulate model guidelines in this regard particularly after taking into account review of issues such as per-capita income, internal resource generation, performance appraisal of teachers, etc. The Eighth Plan document (1992-97) of the Planning Commission has *inter-alia* stated, "higher education needs to be extended in an equitable and cost effective manner mainly by large scale expansion of Distance Education system and increasing private and voluntary agencies". This document has also identified thrust areas such as integrated approach to higher education, excellence in higher education, expansion of education, in an equitable and cost effective manner, in the process of making the higher education system self-supporting, making higher education relevant in the context of changing socio-economic scenario, promotion of value education and

strengthening of managing system in the universities. The concern for better commitment to enhance the quality and efficacy of higher education gets established from the intent of the government from this. The view gets further strengthened in the context of colossal waste in the field of higher education that is being noticed and which requires to be checked. Educational reforms notwithstanding, it is a fact that the percentage of GNP spent on education has increased from 1.2% in 1950-51 to 3.9% in 1986-87, whereas the share of plan expenditure came down from 7.86% in first Plan to 3.55% in Seventh Plan. Besides this, conventional higher education in particular is a picture of national wastage, with outdated courses and lifeless teaching. According to an estimate out of every 100 students who join a college, only 31 complete their degree and out of these, 26 are routine third divisioners. These statistical references apart, the general quality of teaching in colleges with indifferent teachers and crowded classes is nothing short of promoting contempt for collegiate education. The irrelevance of such education is too pronounced to be repeated. In the collegiate sector the innovative approaches, the tools of modern technological information boom, improved teaching styles etc., have not even gone near the periphery of our system. The march of modernity does not seem to have even touched it.

Standards

In such a scenario most of the standards in private colleges present yet a more confusing and gloomy picture. Theoretically they offer new public policy options which means greater educational choice with open enrolment and a different culture of responsibility and accountability. Opening of a private college is a democratic option to offer higher education without any strait-jacket-policy expansion of the state government sponsored system. But private colleges which are normally opened with the concurrence of the state government and are given affiliation by the concerned universities after a formality of sorts, usually live through a prolonged nightmare of financial crisis and make belief of survival through government grant. Most of the private colleges are opened to perpetuate the social instinct to offer higher education of better quality as a social service gesture but soon this activity takes the shape of a business management of a social institution solely looking to the government for substantial soul saving subsidies. The survival of private colleges is directly linked to availability of perennial government grants. In opening new colleges there is neither any careful planning nor is done any area-specific study to see whether or not a private college is really required to be opened. The private managements also in their enthusiasm to

perpetuate their initiative open such colleges without availability of substantial self regenerating financial potential to sustain these in the long run. Very soon such initiatives are ravaged by regional problems, factional management issues, resource crunch, non-availability of teachers, inadequacy of infrastructure, political interference, and many other problems. Soon it becomes increasingly difficult to maintain such colleges which are opened in hurry. Unfortunately, there are no national homogenised guidelines for opening a college. There is no check list of even a few basics which each private management or a state government must get fulfilled in letter and spirit before opening a college. In fact in the absence of any such stringent measures and guidelines the exercise is so free as to have no future commitment. It is for this reason alone that at present we have more than 3000 colleges which are not even eligible enough to attract UGC assistance. They are non-viable and terminally sick but they keep going on seeking grant-in-aid from the government. Their existence is counter-productive and they are looked upon grudgingly by the states as a social liability which they can ill afford to terminate.

Education continues to be claimed as a right and is also linked to the principle of equity but higher education has to be selective and need-based. There is no use multiplying irrelevant and non-productive conventional courses and accommodating extra non-deserving and non-serious students in the already over-crowded classes in the colleges. It is time when exponents of liberalised economic practices and private enterprise could venture into this area and concentrate on relevant higher education while maintaining strict academic standards. The role of universities in such a context is crucial. At present, the universities have failed to maintain standards in collegiate sector. Generally poor performance at the university level is an indicator of this. There is a distinct demise of leadership and vision among the Vice-Chancellors of the universities because they have neither time nor initiative nor any interest to improve the standards in colleges. Their brain time is occupied by campus trivialities and peer politics and at least in balancing political interests. Affiliation is a matter of no serious consequence to them. The linkages with the colleges are poor. Any healthy coordination between the college teachers and the university dons is non-existent. The privately managed colleges become at best small colonies for them to adjust and appoint their own products there irrespective of their merit. The government looks upon these privately managed colleges as institutions with a different culture and as second rate citizens. All the same, because of imminent human problems, these cannot be closed or discouraged;

these have to be allowed to continue with doles and subsidies as per their own determination and criteria – may these be linked to enrolment, year of opening of the college, sanctioned staff strength, nature of affiliation, etc. But no college can fulfil all these. In order to make the system more vibrant and socially responsive, a dynamic policy has to be adopted with foresight and concern for the evolution of sound higher education in colleges.

Once the need to open a new college has been established only on academic grounds, the college must ensure that it has the proper resources to ensure its survival and the maintenance of sound academic standards. The spate of malpractices which are reflected in practices such as non-payment of regular salaries to the teachers, appointment of unqualified staff, irregularity in appointments, overcrowding of classes, coercive collection of donations, unauthorised realisation of dues and inflated fees and funds are a few which must attract university or government intervention. If the universities have the sole prerogative of affiliating colleges for maintenance of academic standards, these must also initiate some action at least to dis-affiliate and phase out some such colleges as are habitual offenders in respect of the above practices and which exploit the students and teachers alike and are doing greater social harm than good. The government pattern of selective grant-in-aid to the colleges calls for a creative review. It should cease to be state liability if the standards are not being maintained. The criteria of performance appraisal of teachers, management's accountability in the shape of students' conduct, their placement and their safe future should be taken into account. No government should allow its scarce resources to be drained into such colleges interminably if their products are merely to swell the ranks of unemployable youth. The government intervention should not be politics-based or regional or communal as per dictates of the politicians. It has to be objective, creative and pervasive. It has at no stage to look as a handiwork of politicians. The role of the management has also to be defined. It has not to be merely supervisory or perfunctory. In fact, it has to be creative and participative besides being promotive all through. No private college can be run like a corporation to be operated with the sole motto of earning profits by its management for its shareholders. Management of a college has to be a participative social responsibility exercise. It has to be through goodwill, commitment and foresight so as to extend the gains of education towards human resource development. The government grants which have to be liberalised should be allowed only if these conditions in running private colleges are met.

Competing Claims

While there is obvious demographic pressure for expansion of opportunities of higher education through opening of new colleges it is necessary to realise what the government can afford for higher education among competing claims for enhanced allocation. The search for alternative models of financing collegiate education is now a dire necessity otherwise the entire exercise at its present pace and demand would become self-consuming and self-defeating without any social benefit and consequence. A sound financial base is the basic requirement and along with this the reassertion of the teaching mandate will have to be made. Where quality and relevance are to be emphasised in colleges, gaps between irrelevant, repetitive and obsolete courses and what is socially and vocationally relevant will have to be removed. Higher education will have to be geared to enhance creative use of government assistance.

The issue of funding private colleges will have to be closely linked to the pattern of people seeking education. The socio-economic constraints that result into social stratification and denial of opportunities to the poor and the downtrodden must be checked otherwise social equality will continue to be an elusive democratic myth with rural population remaining as far behind as ever in their run to collegiate education. So significant inputs in this priority sector are called for. Otherwise the all-consuming social fixation will never vanish and the private entrepreneurs in education, enjoying a cosy connection with urban elite, will continue with their spree of opening colleges in cosmopolitan cities to cater to the sole needs of urbanites. The social disparities will continue to increase and the privileged class of urbanites will continue to reap the benefits of collegiate education. Here the interventionist role of the government is prominent besides being indispensable. The government may not have an exhaustive inventory of its priority areas but the colleges in rural, hilly, backward areas and for women must be encouraged both spatially and specially. The traditional beliefs must be substituted by a new brand of positive intervention to sustain them with plurality of perspectives of recent composition and import. The registered managements running colleges in the cities must be encouraged to assiduously mobilise resources to serve through their enlarged opportunities for investment through the instrumentality of greater liaison with industry, and other investment and return avenues.

Determination and disbursement of grants to the privately managed colleges is a complex issue.

The basic problem is how to improve the level of grants through availability of greater resources and economy in expenditure. Mostly grants pertain to single line prioritised disbursement of salaries to staff and do not provide anything for maintenance functions including general and auxiliary services. For this the private managements have to raise funds and provide for their matching share either through fees or through their own philanthropic resources. On this account the deficits are large. The fees and funds being generally uniform and dependent on year to year enrolments, do not quite support maintenance charge which keeps mounting year after year with changes in priorities, urgent upkeep of infrastructure matters and other items of compulsory expenditure. For this, other ways and means have to be evolved. As these are not being evolved, and maybe cannot be evolved, the situation deteriorates and the institutions suffer. In fact an indepth management study requires to be done in this context to suggest parameters for viability through exploration of self-generating financial potential of institutions of higher education. Analytical studies of collegiate sector have to be carried out. This sector is neglected both by the state governments and the universities and the UGC. There has to be an evaluative study of facilities available in colleges. Public support in opening of colleges is marked in its enthusiasm but as the demand increases, this enthusiasm declines and even disappears leaving such institutions to struggle for their survival. The colleges have no master plans, no future perspective and in fact no future plan of action and reform. It is here that the state government's role becomes pronounced. The role of the universities can be significant but as stated earlier, the universities have no financial concern for the privately managed colleges. It should, therefore, be obligatory for the universities to redefine their leadership role while the government should encourage only such colleges as are viable, otherwise no such colleges be permitted to be opened. The weak managements are a threat to the system and least to say, to the academic standards in overall collegiate education. No social slums and teaching shops be allowed to be opened. The need is to encourage viability and promote sound standards. Every bit of money that is given to a private college or for that matter even to a government college should be an investment to consolidate human resource and not be a mere subsidy or a social charity measure of any consequence, otherwise this practice will consume the system and defeat our desire to carve any future for higher education in the country. The Vice-Chancellors, the state governments and the UGC have a crucial role to play in consolidating the system. The grant-in-aid has to be used as an instrument of

strengthening the system. It has to be flexible, operative and sound. There has to be a professional touch about it. Its impact analysis should be there. Its monitoring should be there. The mechanism has to be evolved for ensuring its proper use and social gains. The wastages have to be consciously cut down and time and human resource better utilized for better social returns.

So where grant-in-aid acquires greater relevance particularly in the context of policy shifts in the shape of full cost pricing of higher education, privatisation, even result-oriented financing of colleges, and amid competing claims to our scarce resources, it is necessary to evolve new strategies for greater internal efficiency in resource use. The low fee structure can no longer be justified as a social imperative as higher education, has to be selective and not totally to be offered at a token fee, the craze for undergraduate education and social compulsions notwithstanding. If this is allowed to continue, this will seriously undermine the quality and content of higher education and maybe it leads to total erosion of standards at the collegiate level. The fees have to be correlated to paying capacity. Soft loans to the needy be introduced. The beneficiaries such as the related industry for which the courses be tailored should share the costs. The accountability checks have to be more stringent. The teachers have to teach more. Multishift utilization of existing infrastructure has to be introduced and establishment expenditure drastically cut down to the minimum. A monitoring mechanism at the levels of the university, state government and the UGC to oversee and periodically review the system requires to be evolved to update it and eliminate shortcomings in the system. Where external checks are called for internal appraisal is also necessary to tone up the entire system. These issues may arouse heated arguments and passions but strict overhauling is the need of the day if the plight of the privately managed colleges has to be improved and if expansion is to be smooth without its undue share of difficulties, poor facilities and financial stringencies in the years to come. The issues concern all. They require the efforts and interest of all. There has to be serious thinking and prompt action by all and at all levels otherwise higher education in the collegiate sector will continue to be a directionless in an exercise leading to hordes of frustrated and unemployable youth in the country and with unscrupulous private managements exploiting the system to their greed, perpetuating mismanagement as ever and with state governments continuously doing the mechanical exercise of offering grants as subsidies to the fast decaying system of collegiate sector.

SCIENCE ADMINISTRATORS

Development of Professionalism in India

Pawan Sikka*

Science and Technology is a key to national development. Financial and human resources devoted to research and development activities represent the principle inputs to the growth of science and technology (S&T) in the country. And, manpower represents one of the vital ingredients of national capability in science and technology. It is some times the pacing item, rather than money and material in many of the R&D projects. The Scientific Policy Resolution of the Government of India, announced on 4 March 1958, had given considerable emphasis to the development of S&T manpower, its training, necessary encouragement required for individuals and through various other means, such as —

“... by offering good conditions of service to scientists and according them an honourable position by associating them with the formulation of policies and by taking such other measures as may be deemed necessary, from time to time, to accomplish the aims of the Scientific Policy Resolution.”⁽¹⁾

Various other policy measures such as Technology Policy Statement, Industrial Policy Resolution, New Education Policy, etc. were enacted by the Government of India towards this end in view. It is because of this concern for S&T manpower that, in addition to provision of infrastructure of S&T institutions, considerable attention has been given to this most important input needed for the development of science and technology viz — the qualified S&T manpower. Jawahar Lal Nehru understood this situation when he remarked that —

“We should produce high class scientists, who would be as good as scientists from any other part of the world, who would stand up to the best men in the world with them. We do have some such persons amongst us, and it is with their help that we have achieved whatever little we have. But one or two, or for that matter ten or twenty of such scientists are not sufficient. We require them in thousands. Only then will our country prosper.”

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This snow-balling of science to make it a major national facet, concerned Pandit Nehru deeply and he strove to achieve this in a multitude of ways in India.⁽²⁾

Scientific Considerations

Meghnad Saha, Homi Bhabha, Shanti Swarup Bhatnagar, Vikram Sarabhai, Mahalanobis, D.S. Kothari, etc. were entrusted with the responsibility of developing and promoting science in the young independent India. Later on, the science at the national level got developed due to the efforts of MGK Menon, M.S. Swaminathan, CNR Rao, A.S. Paintal, etc. Homi Bhabha had said on the role of administration of science in India —

“We have fortunately inherited extremely competent administrative services capable of dealing with all types of administration which had to be dealt with before independence in what was extended to be a static and under-developed economy. Consequently, experience of the type of administration needed for industry and for Science and Technology has been lacking. The type of administration required for the operation of industrial enterprises, and both of these are again quite different from the type of administration required for such matters as the preservation of law and order, administration of justice, finance and so on. The administration of scientific research and development is an even more subtle matter than the administration of industrial enterprises and I am convinced that it cannot be done on the basis of borrowed knowledge. It must necessarily be done, as in the technologically advanced countries, by scientists and technologists themselves.”

To quote Vikram Sarabhai on the subject of science administration in India —

“At one end of the spectrum are certain administrative services acting on past precedents and traditions, providing security and continuity impersonalised to the extent that if one person is substituted by another, everyone knows how the successor will behave and operate under the given set of circumstances. At the other end, there are organisations based on research and

development, involving individuals who act on insights and hunches nonconformists questioning assumptions, innovating and learning.. We would have near-disaster if we have a judge who is an innovator instead of preserver. On the other hand, an educational or a scientific administrator would be sterile and ineffective if he is preserver rather than an innovator. Most tasks encountered in the contemporary world call for organisations wherein creative thinking and innovation are essential ingredients for survival as well as for growth. Industrial and agricultural development and the conduct of foreign affairs call for innovators rather than traditional administrators "

So, as a result of the vigorous efforts made by the various technical colleges, coupled with the strong political support, there were, as on April 1990, nearly 3.01 lakh personnel employed in R&D units in the country, out of which 35.2% were engaged primarily in R&D activities, 32.2% were performing auxiliary activities and the rest 32.6% were providing administrative and non-technical support. Their qualifications range from graduate, postgraduate and doctorate in science and engineering respectively ⁽⁴⁻⁵⁾

Let us examine the number of auxiliary and administrative personnel for each R&D personnel employed for a few selected departments as also for public and private sector industries. It may be seen that the number of auxiliary personnel per R&D personnel was more than one though varies from 0.37 to 2.18 in the institutional sector, whereas in the industrial sector the figures for public and private sectors were of 0.84 and 0.54 respectively (Table 1). The higher number of auxiliary personnel in the institutional sector and public sector industry might be on account of the reason that in the R&D financed by the government sources, adequate technical support is provided to the R&D personnel whereas in case of private funded research, R&D personnel are also being utilised for routine technical jobs. The number of administrative personnel per R&D personnel varied from 0.23 to 3.49 in the institutional sector and the same for public and private sector of industry was 0.39 and 0.26 respectively. The number of administrative personnel per R&D personnel employed in ICAR was very high. This may presumably be on account of the reason that for agricultural experiments, a large number of unskilled personnel are required for field operations. In case of public and private sectors, this figure is quite low. One of the possible reasons for this has already been

explained in the preceding paragraphs i.e. the administrative facilities are mostly common to R&D as also to production, sales, etc.⁽⁶⁾ Thus, S&T manpower constitute a dynamic force in the administration of science in India.

Structure of Scientific Organisations

The central government plays a dominant role in the development of science and technology accounting for about 80 percent of the national research and development funding in the country. The organisation of science in India can broadly be categorised in respect of performance sectors as :

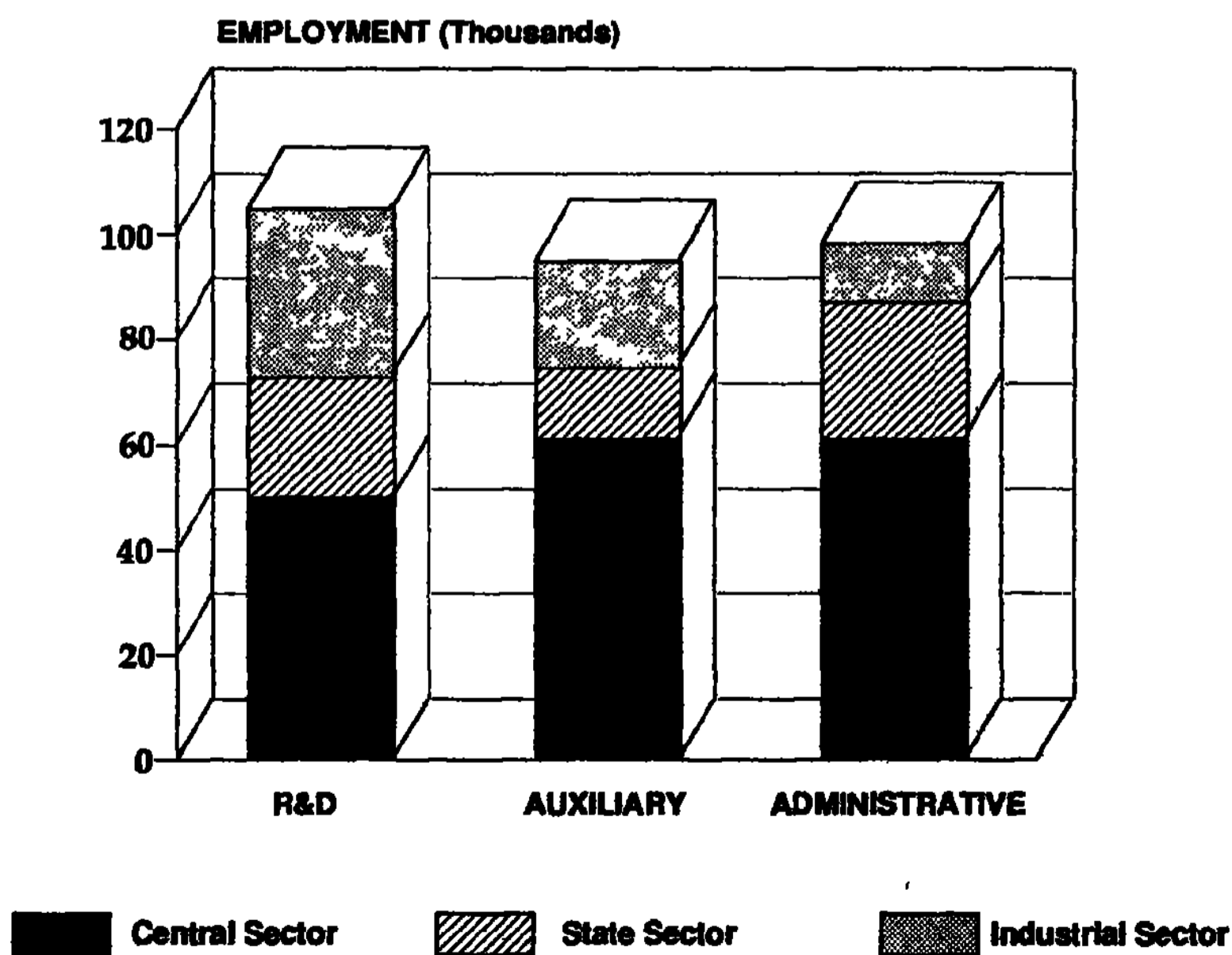
- (a) Major institutions, which include universities and colleges, deemed universities and institutions of national importance, centres for advanced studies in science and engineering, medical colleges and hospitals, agricultural universities and colleges,
- (b) Major three scientific agencies such as the Council of Scientific & Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), and Indian Council of Medical Research (ICMR). Ten scientific departments such as Department of Atomic Energy (DOE), Department of Space (DOS), Department of Science and Technology (DST), Defence Research and Development Organisation (DRDO), Ministry of Environment (DOEN), Ministry of Non-Conventional Energy Sources (DNES), Department of Biotechnology (DBT), Department of Electronics (DOEL), Department of Ocean Development (DOD), and Department of Scientific and Industrial Research (DSIR),
- (c) Cooperative research institutions and industrial in-house R&D establishments in the public and private sectors;
- (d) Ministries of the central and state governments also have R&D institutions performing research specific to their respective missions.⁽⁶⁾

The principles and methods of science administration, the nature and quality of science advice, the role of experts in science policy, infrastructure improvements, the organization of science, research and development in government and industry, the organization of knowledge and information pertaining to S&T, science education, issues of technological utilization and innovation, S&T investments and S&T communications and dissemination in Indian scene are governed by a very complex set of group interests, resource constraints, democratic traditions

Table 1 – Number of Auxiliary and Administrative Personnel Per R&D Personnel as on 1.4.1990

Agency	Number of Supporting personnel per R&D personnel	
	Auxiliary	Administrative
Atomic Energy	0.37	0.23
CSIR	1.99	1.14
DRDO	2.18	1.46
ICAR	1.14	3.49
ICMR	1.72	1.75
Space	1.41	1.20
Other Ministries/Deptts.	1.32	1.59
State Governments	0.66	1.16
Public Sector	0.84	0.39
Private Sector	0.54	0.26
Overall R&D Sector	0.91	0.93

EMPLOYMENT BY ACTIVITY AND BY SECTOR AS ON 1ST APRIL, 1990



and rising expectations. The scientific enterprise in India consists of government, quasi-government, private, non-profit associations and individual efforts. The government is the largest supporter of S&T activities, employs the largest numbers of S&T personnel, funds plans and oversees science education, and is also the largest single utilizer of products, services and benefits arising out of these S&T efforts.

Role of Science Administrators

Science and technology in the country is promoted by the qualified S&T manpower mostly who work for the three scientific agencies viz. CSIR, ICAR and ICMR, and the ten scientific departments of the Government, viz. DST, DBT, DSIR, DOD, DOS, DAE, DOE, DOEL, DNES, DRDO, etc. These science administrators are entrusted with the following major responsibilities so that scientist researchers achieve excellence in their narrow areas of research and development activities. Thus the nature of work of science-administrators concerns among other things —

- * Formulation of policy guidelines in subject areas of science and technology,
- * Promotion of research and infrastructural facilities in newly emerging and frontline areas of S&T;
- * Coordination of programmes having cross-sectoral, multi-disciplinary and multi-institutional interests;
- * International S&T Cooperation; and
- * Providing support to a number of grants-in-aid scientific institutes and professional bodies involved in promoting S&T in India.

M.G.K. Menon, himself an eminent science administrator, observed on this complex issue, that —

“a large part of the administrative system governing science (rules, procedures, financial and personnel management policies) are those which relates to normal Government administration, whereas scientific work demands a non-hierarchical, highly flexible, trust-oriented approach. A true appreciation has yet to come about concerning the relevance of science for national development amongst the large number of those dealing with political decisions and in administration, finance and the production sectors.”⁽⁷⁾

This necessitates the need of understanding the latest principles of management science. Managing science, technology and innovation as a viable concept is a relatively new phenomena. There are many problems in the world stemming from political or

economic sources. Considering the magnitude of problems in the world, a cursory look could leave the impression that many of these problems are insolvable. Many technology-related problems are so extensive that the resources of jurisdiction of any one organisation or political entity would be severely strained at best or probably inadequate to reach a satisfactory solution. This is where the question of linkages comes in. Science by itself can indicate several options. However, it is necessary to link them with the needs of the society. This would be the responsibility of the management system, especially of those who deal with the development work and administration. While the scientists have a role to play in assisting the administrators, the managerial staff must learn more science, assimilate more science and understand what possibilities science can offer. The successful application of technology to industry and agriculture depends basically on the willingness and ability of production enterprises in these fields to commit themselves to a path of technology innovation. Even after they make this commitment, there must be continuing interactive linkages between the production systems and the science and technology system so that the latter can make effective contributions. So far India's record in promoting indigenous technology innovation and adaptation, and in building linkages between R&D establishments and industry has not been impressive. This calls for the introduction of certain remedial measures in the existing S&T system, so as to make science in India more effective and beneficial to the masses.

It is quite possible that some significant structural and organisational changes will be needed to permit more rapid progress in India. In this context, the establishment of a coordinating mechanism for the prevalent S&T system in India i.e. National Science & Technology Commission (NSTC) is recommended to use corrective measures for the ills of the Indian science and oversee and coordinate the S&T efforts towards managing the role of S&T in planning and to decide priorities within the various sectors as well as to avoid uneven growth of science in the various sectors of the country affecting the economic development of India.^(7, 8)

Shri Rajiv Gandhi, while delivering the valedictory address at the concluding session of the 73rd Indian Science Congress on 8 January 1986 at New Delhi dealt with the subject of bureaucracy in the management of science. He remarked :

“The real question which we are facing in science, in technology, in research, and generally

across the board is that of management. How are we going to handle our scientific management? This perhaps is the root of getting more output from our scientists.

"Pandit Nehru, addressing the Indian Science Congress in 1963, had said : 'Our laboratories have done good work and yet I have feeling that all is not quite well with these labs'. Perhaps, I could repeat that today. Questions of seniority, questions of a bureaucracy coming into scientific management, of mediocrity creeping in at the higher administrative level and many other such questions have to be answered. They cannot be answered by us, they must be answered by you scientists. The only real way to get our best scientists operational in their fields is to refuse to accept mediocrity at any level. And this is the real challenge that our scientists must tackle on their own."⁽⁶⁾

Cadre Service for Science Administrators

There is a tremendous need for competent and well trained administrators to decide on the right strategy for development and to carry out those decisions according to plan, in a developing country like India. Among these administrators, many have to take decisions which deal with scientific and technical matters, such as policy issues, health projects, new industrial processes, improved agricultural methods, inter-disciplinary and inter-institutional projects, development of power resources, disaster mitigation, and many others.

The need is very great, therefore, for persons sufficiently well versed in science and technology to be able to make technically sound, realistic and prompt decisions. The best training for such posts is research experience and a thorough education in the fundamentals science.

The Government of India has now exempted all the scientific departments from the purview of the Union Public Service Commission (UPSC) for the purpose of recruiting scientific officers so that the delay in recruitment is avoided. This necessitates the need for structuring a formal intensive course in Science Administration for inculcating professionalism among the scientific officers who opt for such a career. There is already a separate Recruitment Board for Agricultural Scientists in India

An Indian Scientific Service (ISS) should be created involving scientific officers of all the scientific departments and agencies. Officers of the Indian Scientific Service should be got trained at Lal Ba-

hadur Shastri Academy, Mussourie, and Institute of Parliamentary Studies besides providing training at the National Institute of Science, Technology and Development Studies (NISTADS-CSIR), Indian Institute of Public Administration along with other civil service officers, in all aspects of science and society. In-service training be provided to the already employed science administrators so as to develop their capabilities for rendering excellent service towards the administration of science and technology in India.

Thus, with a view to administer the systematic development and application of science and technology in all its aspects – teaching, R&D, applied and commercial – in the country, there is an urgent need to create a cadre of science administrators who should function in the scientific ministries; agencies and several other S&T organisations in India. There should be uniformity of pay scales, promotion avenues, inter-departmental mobility to gain wide experience, etc. There are very many activities which the science administrator can attend to – such as release of grants, utilisation of project funds, recruitment and training of skilled manpower for the timely completion of the projects, purchase of equipment and machinery, accountability towards audit leading to the effective management of scientific and technical organisations in India.

[The views expressed here are the personal views of the author only.]

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Some Areas for Research in Educational Management

M.S. Ramamurthy*

The objective of management is to improve efficiency and increase productivity. Management is a mechanism for achieving effectively institutional objectives in an efficient way. Management *per se* is no doubt a subject of study. But what we are concerned with here is its applicability to particular environments. Complementary to the observation is that organisational objectives determine management models, procedures and style. Certain principles of management may be basic or fundamental but their ramifications could be different in different settings. It is in this context that one has to view the increasing interest shown by management experts at prescribing remedies for the ills of our higher educational system. Suggestions made for organisational development, marketing products, pricing, etc., should take into account :

- (i) The Indian conditions and heritage, and
- (ii) The characteristics of educational management.

Unless these are recognised, findings would not be of practical value.

The Indian higher education system is large – unmanageably large to be monitored by a single agency operating at the national level. The system is also amorphous insofar as a wide variety of institutions comprise the system. The type of management in education the world over has been characterised as ‘collegial’ in as much as consultation and consensus form the basis of management in higher education institutions. Business operations do not have this characteristic to the extent that higher education institutions have. Management practices derived from business operations therefore would need careful appraisal before being adopted by the educational system.

The legal environment within which the system has to operate is another major factor. Higher education in India is not a free enterprise. There are

provisions in the Constitution of India which lay down the division of powers between the Centre and the States in matters of education. There are also coordinating bodies at the national level, which are statutory creations, like the UGC, the AICTE, etc., which have a say in matters educational including those that influence, either directly or indirectly, management patterns, methods and procedures. Since universities can come into being only on the basis of an Act of the Parliament of India or of a State Legislature, the provisions of the Act also determine management patterns.

It is the government which is the sponsor of the higher education system and it is they who are instrumental in coming into being of the vast higher education system that one sees in India today. Governments continuously intervened to set right malaises in the system. Such interventions have been many, frequent and also pervasive. The widely prevalent attitude of looking up to the sponsor for solutions to hurdles and problems encountered did not escape percolating into higher education institutions as well. The demand for autonomy by the higher education institutions lost its cutting edge therefore. More importantly universities did not learn to become self reliant.

The point to note is that not only the backdrop of legal provisions but also the Indianness and the peculiar features of higher education need to be reckoned with before suggestions are made for effecting a more effective management of the higher education system and its entities.

It is the objective of this article to indicate some areas for such study against the backdrop mentioned above.

II

One feature of higher education system which is peculiar to India – perhaps unique in the world of today – is the affiliation system. The system of affiliation was introduced by the then British rulers into India even as the very same system was sought

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to be given up in Britain. One cannot but conclude that the system was found suitable at that time and for serving the objectives of the ruling class. Affiliation served as an effective mechanism for restricting growth and opportunities, for preserving elitism and perhaps for maintaining quality. In this mechanism considerable powers were vested in the university. The university had the final say in granting affiliation. Today higher education has come to serve a mass base. The mechanism, however, has still survived. Should not the change from selective to mass higher education lead to a change in the mechanism of affiliation? If so, what changes need to be made? How has the affiliation mechanism survived? What changes have been made in the procedures, criteria, etc.? Do the revised criteria/procedures meet the original objectives of affiliation? This is an Indian problem and an Indian answer has to be found. In doing so the analogy of a 'franchise' as available in management of business may also bear examination.

In arriving at an answer to the above, two more realities need to be taken note of. One is that the Education Commission (1964-66) in its report had recommended grant of autonomy to at least 500 colleges over a period of five years or so. The reality today, i.e., 25 years after the recommendation was accepted, the target has not been met. Why? Are the reasons purely technical or social or educational or political? The second is that under Section 2(f) of the UGC Act, 1956 colleges are recognised by the UGC, after observing a prescribed procedure, for giving development grants to the college. Not even 50% of the over 7000 affiliated colleges have come into the fold of Section 2(f). The non recognised colleges however continue to be affiliated and function. How do they manage? Are two separate recognitions, one for affiliation and another by UGC necessary at all in educational terms? Can the criteria for affiliation and UGC recognition be common, if not entirely, at least, such that one overlaps the other?

On the managerial aspect of a university there are various reports on university governance. For recommendations of such reports to be implemented, political decisions in the form of amending university Acts are no doubt required. Why are they not happening? What are the reasons for the authorities in government not falling in line? Impressionistic guesses would not do to answer the issue. Empirical data should be collected and codified.

What would be an ideal method for effecting

coordination in 'collegial' types of management? Answer to this should be provided by analysis of actual empirical data.

A study of the functioning of the coordinating bodies at the national and the state levels in the changed circumstances of (a) phenomenal increase in numbers, (b) financial crunch, and (c) impact of change from a command economy to one of entering a global competition is also urgently required. The objectives should be not to find fault with what has happened in the past. But the past should provide data to be able to build directions for a healthy future. Today the slogan is past is past. Think of how to move into the future from the present.

Peter Drucker said that planning and implementation are not two different jobs; they are two activities of the same job. In this spirit study should encompass suggestions for realistic implementation.

III

A word of caution would perhaps be in order at this stage. Desk research based on secondary sources would not suffice where the issues are both educational and operational in nature. While such a research by itself may be of value, it has to be essentially initiated by practitioners in the field who have a perceptive feel for and actual experience of the ground situation. It is only this which will orient the study towards implementation. A second important aspect of such research is that to provide theoretical underpinnings a team consisting of both academics and practitioners should undertake the job. The members of the team should be capable of reinforcing one another.

Finally, it must be added that the issues suggested hereinabove are not exhaustive. Considerable work needs to be done in the area of economics of higher education, for example. A number of research studies in this area can no doubt be thought of without having recourse to findings of studies done abroad. Such work should lead to building up of indices for performance appraisal of institutions as also for funding by sponsors. One can go on to indicate specific titles for research in the area of economics of education. Also other areas need to be covered for study. But the objective of this article would be met if discussion is provoked on some issues and action initiated for undertaking studies in some areas and a list of titles for research comes into being.

Continuous Internal Evaluation

A Viewpoint

Mamota Das*

According to the Report of the Education Commission (1964-66), "The crippling effect of external examinations on the quality of work in higher education is so great that examination reform has become crucial to all progress, and has to go hand in hand with the improvement in teaching." The continuous internal evaluation was introduced as a supplement to the present final examination to improve the standard of evaluation, integrate teaching-learning-evaluation, and make examinations an educational experience rather than a nightmare for students.

No doubt it began with pious intentions but unfortunately over the years it has come a cropper, though it seems to be going on well as it has raised the standards on paper. This leaves a false impression because the students of today cannot solve even the day to day problems in life, and there seems to be no link between marks obtained by and the calibre of the students

The term "Continuous Evaluation" implies that teachers are responsible either on their own or in collaboration with other teachers for evaluation of their students. It serves to update the teachers' judgement about their students from time to time.

The following questions arise regarding the term "continuous" "

1. What is the extent of continuity regarding the number of intervals, regularity of intervals coordination between intervals?
2. What is the continuity in distribution of lesson units? and
3. What is the continuity in providing feedback to the teaching and learning process?

There seems to be no appropriate answers to these, as the extent of continuity is abrupt, number and regularity of intervals vary according to convenience, and distribution of units is unequal. Only those units are taken care of which can be dealt with easily and questioned through examinations; the

difficult ones from teaching point of view are left for the students to tackle themselves either in the form of tutorial discussions/seminar readings/assignments/or leave it as 'choice' in the external examinations.

The internal evaluation should be shown to the students for 'feedback' purposes in order to enhance learning activity. This 'feedback' can be either positive or negative to the students as well as teachers since it provides increased awareness to both about their performance in relation to the accepted educational objectives and goals.

It is said to state that the majority follows the practice of 'feedback' in helping the students in :

1. Checking up the total,
2. Pointing out questions left unmarked, and
3. Stating that the same answer given by students has been evaluated differently.

The comparison of individual's performance within the same group or intra-individual comparison is not taken care of

We are yet to hear of cases where teaching strategy has changed after the 'feedback' or improvement made in setting question papers.

In the present day university system 'Internal Evaluation' does not seem to be of students but of the teachers themselves. It is more or less an ego clash of self evaluation among teachers indicated by the internal marks awarded to their respective students. The consequence of it is that in many universities the internal assessment marks are not taken into account because the difference between the two evaluations in majority of the cases is more than 15% which questions the validity of evaluation. The internal evaluation marks are future guidelines for selection of subjects and area specialization. The higher the internal marks awarded, the more the attraction of students for the subjects and the teachers.

In many universities the continuous internal evaluation is given more importance or weightage than external evaluation. For example 75% internal, 25% external. The result of which is that the students are not bothered about the external examination and the teachers have an artificial control over the stu-

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dents being their internals and students pay false respect to teachers till the time they feel the 'marks grip' which in turn is leading to mistrust, disrespect, moral deterioration, outward boost and inward vacuum.

Suggestions

1. State Councils of Higher Education should immediately appoint a review committee on Examination Reform to provide Plan of Action for achieving the following :

- i) Revision and modernization of courses of study;
- ii) Students' growth in a tripartite combination of cognition, conation and affective domains;
- iii) Attitudes and skills to be tested through continuous evaluation;

- iv) Compulsory provision of students' performance profile;
- v) Maintenance of internal evaluation records;
- vi) Yearly review of the system;
- vii) Openness of the system;
- viii) Feedback to be practised; and
- ix) Review of tools of continuous internal evaluation for measuring learning outcomes.

2. The University Grants Commission should appoint a review committee on the basis of the report submitted by the various State Councils of Higher Education for plan implementation in order to save Education.

CALENDAR OF EVENTS

Proposed Date of the Event	Title	Objective	Name of the Organising Department	Name of the Organising Secretary/ Officer to be contacted
September 13-22, 1993	Computer Application in Social Sciences	To orient the social science researchers to fundamentals of computer, computer processing, foundation of data processing, quantification method and use of SPSS	Centre for Social Studies, Surat	Vimal Trivedi Course Director Centre for Social Studies, South Gujarat University Campus, Udhna-Magadalla Road, Surat-395 007
November 5-7, 1993	National Seminar on Heterocyclic Compounds in Drug Development	To focus attention on research in heterocyclic chemistry with reference to drug development and disease prevention	National Academy of Chemistry & Biology (India), Lucknow	Dr. R.S. Varna, Chemistry Department, Lucknow University, Lucknow - 226007
December 14-16, 1993	1993 Annual Conference of the Society for Research into Higher Education	Theme : Governments and the Higher Education Curriculum Evolving Partnerships	Society for Research into Higher Education, London	Prof. Tony Becher, EDB, University of Sussex, Falmer, Brighton BN 1 9 RG, U.K.
December 26-29, 1993	IASLIC Conference	Theme Collection Development in the context of Economic Recession	Birla Institute of Technology, Mesra, Ranchi	Prof. U.N. Singh, Organising Secretary, C/o Birla Institute of Technology, Mesra-835215, Ranchi
February 10-11, 1994	National Symposium on Advances in Veterinary Research	Theme : Animal Health and Production	Indian Association for the Advancement of Veterinary Research, Bareilly (U.P.)	Dr. T.N. Jaiswal, Head, Division of Standardisation, Indian Veterinary Research Institute, Izatnagar-243 122

Curriculum Development Programme of UGC

L.C. Singh*

The Context

Higher education in India has grown tremendously since Independence. In 1947, the total number of students in colleges and universities were 2.5 lacs out of the population of 350 million. At that time 80 percent of the enrolment was in undergraduate courses and very little in professional subjects. Almost there was no facilities for postgraduate teaching and research (Khanna, 1991). At present, there are over 200 universities, both statutory and deemed, and over 7000 colleges of all sizes and shapes. A student population of nearly 4 million is being groomed into an adulthood by about 250000 teachers (Ghanchi, 1993). Of this student population, 89 percent is in undergraduate and 10 percent in postgraduate courses. Only one percent are in research. This huge structure of higher education is, however, impregnated with large number of pitfalls. To glance a few, one would notice that there is (i) unplanned proliferation; (ii) inadequate infrastructural facilities like buildings, laboratories, libraries and teachers, etc.; (iii) disrupted academic activities and calendar of universities and colleges; and above all (iv) unemployment, underemployment and unemployability of the educated youth. All these shortcomings point out that in spite of huge investment in higher education (ranging from Rs. 1500 to Rs. 5500 per capita), the social return is much lower.

A developing country like India can ill afford waste in terms of human resources. There is, therefore, a dire need for creating a framework and programme of action to reduce the degree of mismatch between higher education and manpower needs of the country. The situation calls for special efforts and programmes in the university sector to develop human resources compatible with the requirements of the contemporary society on the one hand and to evolve mechanism for generation of new employment opportunities on the other.

Keeping this in view, the UGC brought in a number of programmes to get quality improvement in higher education and promotion of excellence in teaching and research. For example, a number of university departments have been identified under

the programme of Special Assistance for strengthening teaching and research, some colleges have been selected for participation under the programmes of COSIP, COSSIP, VLP, etc. In order to update the knowledge and professional competence of teachers, 48 Academic Staff Colleges have been set up, where more than 2500 teachers have been benefited by attending orientation and refresher courses.

One of the objectives of higher education is the pursuit of excellence. "This can best be achieved through deep commitment to this cause and adopting appropriate strategies with respect of these aspects : upgrading the curricula on a continuing basis; strengthening of university college linkages; manpower planning; institutional development; university-industry interaction; information system and awareness, educational and research programmes (Khanna, 1990) "

In fact we should design a mechanism to solve the perennial problem of outdated programmes in higher education. We ought to review our academic programmes and the courses on a continuous basis. Right now, it seems that an academic programme or course once offered continues for infinite number of years. We think there should have been a built-in mechanism wherein an academic programme or a course has to repeatedly prove its worth during its respective reviews, otherwise it will be discontinued. And even if it is allowed to continue, there have to be modifications or a lot of changes made to keep pace with the experience in the field of knowledge (Sodha & Passi, 1993).

Curriculum Review and Renewal

The UGC is reviewing the structure of courses of study at the undergraduate level with a view to bringing about necessary improvements in the curriculum by including therein skill-oriented courses. The curricula need to be carefully designed to encourage students to learn in their own way instead of pursuing the exposition of a discipline as the teacher conceives of it. However, it is of significance to take note of the fact that case studies and demonstration experiments in higher education should relate to solution of real problems. However, the economic constraints, among others, have slowed down the process of qualitative improvement in areas of curriculum reconstruction, examination

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reform, teacher training, enrichment of infrastructural facilities, student services programme, open learning system, and R&D in higher education (Ghanchi, 1993).

In recent years, it has also developed model curricula through interaction of large number of academics organised by the Curriculum Development Centres established in the university system. This programme was taken up by UGC in order to promote excellence in teaching at undergraduate and postgraduate level. The UGC set up curriculum development centres in different universities for different subjects. It was further specified that the curriculum at the postgraduate level would be framed by a group of experts drawn from among such university departments which had already shown positive evidence in their capacity to update the curriculum. The university faculty members drawn from different regions of the country and representing different subdisciplines of a main discipline and potential employers were to be involved in the curriculum development programme. In the light of this, twenty seven Curriculum Development Centres were set up in various subjects. For science subjects, these centres were opened in universities at Jaipur, Roorkee, Madras, Chandigarh, Ahmedabad, Bangalore, Baroda, Pune and Calcutta. In case of social sciences, the Curriculum Development Centres were opened in universities at Bombay, Patna, Calcutta, Hyderabad, Bhubaneswar, Ranchi, Baroda, Trivandrum, Allahabad, Shantiniketan, Varanasi, Bombay, New Delhi, Pune and Aligarh. In some universities, Curriculum Development Centres were opened in more than one subject. These centres developed model curriculum in 22 disciplines which were discussed at national level workshops. (UGC Annual Report, 1990).

These curricula have been sent to the academic councils of universities in the hope that these efforts on the part of academics would influence the higher education system significantly and help bring about some parity in standards. This process has to be dynamic and yet within the framework of the autonomy of the universities.

Research Questions

The following are the research questions which emerge from the above discussion :

1. How many universities adopted the curriculum or placed the same before their academic bodies such as Academic Council/Board of Studies? What are the achievements?

2. The terms of reference of such centres were to suggest ways and means for preparing textbooks, teaching aids, library as well as laboratory equipments for effective implementation of the proposed curricula. Did the agencies concerned with development of such a material like EMRCs and AVRCs made an effort in this direction?

3. Has the programme of countrywide classroom, utilising electronic media like T.V. and video, made a venture according to the proposed curriculum material for students of higher education?

4. Another objective of the curriculum development programme was to suggest how the teachers are to be oriented and trained in order to impart instruction in accordance with the revised curricula. Did the Academic Staff Colleges which were established with the objective to train teachers of higher education made efforts to make use of the model curricula? Did the forum of teachers in these staff colleges considered these curricula and got orientation to teach the students according to the revised curriculum?

5. What are the constraints which did not allow the universities to adopt/adapt the model curricula; the AVRCs and EMRCs to broadcast the same through visual media; and Academic Staff Colleges to train the teachers of higher education in revised curricula?

All these questions need to be researched for seeking answers so that the desired objectives of curriculum development programme – an important national venture could be accomplished. It is expected that these model curricula would bring about some qualitative change in the academic standards at the undergraduate and postgraduate level.

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English Literature Course in the Indian Context

H.G.S. Arulandram*

While designing the English Literature course, at the collegiate level, one has to necessarily take into consideration two important factors : one, the aspirations of the academics and two, the demands of the society. While the academics lay stress on the pursuit of knowledge for knowledge's sake and on learning for widening one's perspective and outlook on life, the society demands the pursuit of knowledge for practical ends. How far is the course job-oriented? How far has the course trained the individuals to become useful and worthy members of the society? How much relevance has the course to real life and life situations – these are some, if not all of the demands of the society.

In the Indian context, the teaching of English, especially English Literature faces a number of pressures from the society. There are still people who question the validity, necessity and relevance of the study of English language and literature. Simply contented with learning their own mother tongue alone, they even go to the extent of negating the necessity for learning English. There is also another group of people, who, with their slightly broadened outlook maintain that the Pan Indian spirit must be maintained and fostered and therefore advocate a two language formula. That is, the study of the regional language plus an All-India language which unifies the entire country. Some others, a majority, feel that India's identity has emerged and is sustained by the links with the outside world and therefore they strongly advocate the need for a three language formula in which the English language is considered as the global link language.

When these are the different expectations of different groups, the English Literature course must meet all these demands while at the same time not sacrificing its highest aim – that of promoting a cosmopolitan pan world outlook. Literature carries the ethos and culture of the people. To study literature is to understand the ethos and culture of the people and thereby widen one's perspective and outlook. Therefore in an institution run and main-

tained by the tax payers' money, the English literature course must give an equal importance and emphasis to the pragmatic side as well as the ideal side.

Therefore there is a need to restructure and revamp our English Literature Course : and make it socially relevant and meaningful. It is suggested that Five-year Integrated M.A. English Course – integrating three year degree and two year Postgraduate programme – could be tried out. The educational advantages of this course will include

- a) Only really interested students will opt for the course,
- b) No entry of candidates without basic idea of literature,
- c) No repetition of papers of study,
- d) Intensive study of literature and language,
- e) Mastery over language and literature,
- f) More papers of applied and job-oriented nature,
- g) No staffing problem, and
- h) University Grants Commission's encouragement.

The suggested model course structure is given below :

I - Semester

Part-I	Language Paper-I
Part-II	One of the foreign languages-- French / German / Russian / Spanish Paper-I
Part-III	Allied-I Social History of Eng- land Major Paper-I Short Essays Major Paper-II Short Stories

II - Semester

Part-I	Language Paper-II
Part-II	Language Paper-II
Part-III	Allied-II History of English Lit- erature Major Paper-III One Act plays Major Paper-IV Biography & Autobiography

*Director, Curriculum Development Cell, Bharathidasan University, Tiruchirapalli-620024.

III - Semester

Part-I	Language Paper-III
Part-II	Language Paper-III
Part-III	Allied-III Literary Forms
	Major Paper-V Novel-I
	Major Paper-VI Prose-I

IV - Semester

Part-I	Language Paper-IV
Part-II	Language Paper-IV
Part-III	Allied-III Business English
	Major Paper-VII Novel-II
	Major Paper-VIII Prose-II

V - Semester

Major Paper-IX	Poetry-I
Major Paper-X	Drama-I
Major Paper-XI	Literary Criticism-I
Major Paper-XII	Spoken English
Major Paper-XIII	History of English language

VI - Semester

Major Paper-XIV	Poetry-II
Major Paper-XV	Drama-II
Major Paper-XVI	Literary Criticism-II
Major Paper-XVII	Comparative Literature
Major Paper-XVIII	Modern English Structure

VII - Semester

Major Paper-XIX	Shakespeare
Major Paper-XX	Indian Writing in English
Optional-I	

VIII - Semester

Major Paper-XXI	American Literature
Major Paper-XXII	Intensive study of a Writer/ Genre
Optional-II	

IX - Semester

Major Paper-XXIII	Commonwealth Literature
Optional-III	
Optional-IV	

X - Semester

Major Paper-XXIV	Essays
Optional-V	
Research Methodology and Project Work	

List of Optionals (Illustrative)

1. Translation.
2. Teaching of English
3. Creative Writing
4. Script Writing
5. Journalism
6. Practical Criticism
7. Interpreter training
8. Art Appreciation
9. English for official purposes
10. Public Relations
11. English for Tourism
12. Computer Programming
13. English for Competitive Examinations
14. English for Scientific purposes
15. Document Writing
16. Book-Reviewing
17. Travel Management

UNIVERSITY NEWS

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Buddhist Education System

Prof. G. Ram Reddy, Chairman, University Grants Commission, delivered the Convocation Address at the 3rd convocation of the Central Institute of Higher Tibetan Studies, Sarnath. He said, "People are looking to present day education to stress certain religious and ethical values in it. In this respect we have a great deal to learn from the Buddhist system of education which lays stress on the inculcation of social responsibility, promotion of social welfare, formation of character building, spread of national culture, secular and religious harmonisation, inculcation of ethical values, religious catholicity, tolerance, mutual respect, piety, truth and honest, etc." Excerpts

For centuries, education has been viewed in this country as a powerful medium in transmitting the cultural values of one generation to the other. Buddhism came into existence as a reaction to the Brahmanical orthodoxy. Its missionary tendency and direct communication with people broke such orthodoxy. First, it employed Pali the spoken language and secondly it opened portals of education to all, irrespective of caste or class. As is well known, it did not sanction caste privileges and social monopolies. According to the existing practices, the low caste people were denied opportunities of receiving education and only privileged castes could have access to the scriptures. Buddhism emerged as a powerful force which ushered in an era of atonement for people and left far reaching impact on their minds, who accepted it as a great liberator.

One of the means of such liberation was the Buddhist system of education. They recognized educational structure which operated through the famous Buddhist monasteries. Scholars from different countries flocked to such centres. The *Bhikshus* (Monks) became custodians of this culture. They were vested with the right to receive religious and general education. The Buddhist education had to fight with other religious educational systems such as those organised by the Brahmins. It preferred general education through the establishment of public

educational systems. Monasteries were developed into corporate educational institutes. They enjoyed absolute autonomy, strong democratic spirit and liberal atmosphere in their functioning. Their objectives were to teach people of their (a) civic responsibilities; (b) training in different arts and industry; (c) teaching of religion and philosophy and inculcate among people the values of a code of discipline and ethical conduct; (d) peace and non-violence; (e) truth; (f) healthy mind and body; (g) religious catholicity; and (h) doctrine of *karma*.

The world, according to Buddhism, is full of sorrows, salvation can be obtained only by renouncing it. The aim of preparing a person for the future life existed in this period. It also emphasised the development of rationality.

Egalitarianism was an important feature of Buddhist education – education was opened to all people. It is interesting to note that there was no discrimination based on caste or sex. Its education included comparative religion, mythology and philosophy, practical and secular training, study of subjects like Sanskrit, Pali, medicine, astronomy, law, administration and vocational training for earning livelihood. The *bhikshus*, it appears, were deputed to oversee the construction of buildings and giving practical training of weaving, spinning, tailoring, etc. Here we find that the system of

education emphasised not only subjects like philosophy and mythology but also medicine and administration. We see here that the *bhikshus* were the precursors of modern academics going as consultants to industries and other organisations.

Buddhist education stressed bridging the gap between theory and practice. Education of women is another notable feature of this system. Since Buddhism started as a reaction to the rigidities of Hinduism, its approach was reflected in its education where it avoided the extremity of self-indulgence and self-abnegation. In fact, it favoured the middle path. The monastic life highlighted the virtues of celibacy, poverty and prohibition of sexual relationship. Mendicancy was advocated for living.

As in some of the present day educational institutions, the admission procedures were prescribed. One could only get into a monastery by the initiation ceremony. The person seeking admission had to wear yellow robes and say, "I take refuge with Budha, I take refuge with religion, I take refuge with the order". In a sense this was the oath which was followed by the commandments which stressed abstinences from taking life; taking what is not given, impure practices, telling a lie; intoxicating drinks; eating out of time; dancing, singing and seeing shows; using garlands; scents, ornaments and finery; use of a high and large couch or seat; lastly receiving gold and silver. Commenting on these commandments, Professor R.K. Mukherji observes, "The sacredness and inviolability of these moral, political, social and economic obligations were thus very properly emphasised and recognized by the order which did not countenance the violent and revolutionary method of accomplishing spiritual revolution".

This system of education stressed highly personalised and individualistic aims. The *guru* was

important and the student was to render service and respect to him. This was considered to be the highest duty of a student. The *guru*, in turn, was to be considerate and sympathetic to his students. In fact, the *gurus* were required to have well balanced personality, scholastic attainments, simple living, laudable character and self-discipline. One could, without any hesitation, prescribe these characteristics for the present-day teachers. Both the present-day teachers and students could do well to follow these tenets of Buddhist education.

Around the fifth century B.C., the Buddhist system of education emerged as a monastic movement by outlasting Brahmanism². During the next thousand years or so it became a powerful dynamic force moulding every aspect of Indian social and traditional values. In some of the Asian countries Buddhism and its educational philosophy are clearly visible even today. Here one sees a mixture of tradition and modernity. This can also be observed from the fact that literacy rates are very high in practising Buddhist nations like Sri Lanka, Japan, Thailand, etc.

Let me now invite your attention to some of the institutions of higher learning. There were very famous Buddhist Universities like Nalanda, Vallabhi and Nagarajuna. They were of international fame. Huan Tsung, the Chinese traveller, states that *Viharas* at Nalanda were built by successive Kings. He says that "the whole establishment is surrounded by a brick wall. One gate opens into the great college, from which separated eight other halls, standing in the middle".³

The Buddhist Universities attracted students from countries like Japan, Korea, China, Tibet, Java and Sumatra. Nalanda University was easily the most famous. Its hostels consisted of 300 rooms and there were in residence 8,500 students, 1,510 teachers and 1,990 menial staff. This composition of teaching, non-teaching staff

and students compares favourably with the present-day composition of these categories. I-tsing, a Chinese traveller, describes in great detail the living conditions of students at Nalanda hostels. In hostels the main consideration was to see that the students were not disturbed in their studies. This was the criterion for providing accommodation to the students. I-tsing writes: "The daily time table was regulated by means of a water clock, a contraption consisting of a large bowl of water with a smaller perforated one floating in it, each immersion of the smaller bowl indicating a quarter of an hour which was announced by one stroke on a drum. A working day for teachers and students was 8 hours".⁴ R. N. Salatore quotes further details from I-tsing who says that there were more than 10 large pools near the University where thousands of students could take bath simultaneously. The hostels had single and double rooms with some benches and niches for books and lamps. An hour was fixed in the morning for bathing and a bell was sounded to remind the students of the bathing hour. Hundreds of students could leave the hall and proceed in all directions to the pools for taking bath.⁵ The details of the management of the university hostels are provided by Chinese scholars. According to them the community of monks looked after the management of hostels, "The affairs of the university, from the annual assignment of rooms to the trial and punishment of offences against the fraternity and expulsion of recalcitrants were administered by the entire body of the students". This is a good sample of involvement of students in the affairs of university and hostels. There were staff to look after such functions as distribution of places amongst students, distribution of roles, receiving of books, distribution of dry-fruits, etc.

From the various accounts we get the impression that the relationship between teachers and

students were very cordial.

Even a superficial examination of the Buddhist educational system reveals that it has great relevance to the modern times. In India, we are facing dissipated tendencies, marked by political turbulence, economic, social inequalities, religious bigotry, caste discrimination. People are looking to present day education to stress certain religious and ethical values in it. In this respect we have a great deal to learn from the Buddhist system of education which lays stress on the inculcation of social responsibility, promotion of social welfare, formation of character building, spread of national culture, secular and religious harmonisation, inculcation of ethical values, religious catholicity, tolerance; mutual respect, piety, truth and honesty, etc.

Although I am not a student of Buddhism, I am greatly impressed by the Buddhist education system. I am sure, the Buddhist Scholars would be able to throw more light on the education system evolved by Buddhism and its impact on education not only in India but also in countries like Japan, Korea, Thailand, China. All over the world people are discovering their roots. In this respect our roots are very strong; we only need to highlight the important features of these roots. It will greatly help the present day generation if we can cull out the best features from our ancient legacy.

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3. Thomas Watters, 'Yuan Chawng's travels in India', quoted in M.V. Sundarajan, *Management of University Hostels*, 1990, Secundrabad, Chari & Co.
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CAMPUS NEWS

New Vocational Courses in GND Varsity

Prof. G.S. Randhawa, Vice-Chancellor of Guru Nanak Dev University, said that there should be co-ordination among industry, education and technology and the need of the hour was to design courses to match the economic reforms for improving productivity, efficiency, growth, market orientation and globalisation to create opportunities for jobless graduates.

Prof. Randhawa said the university was making all efforts for an interface with the industry and was poised to a crucial role in training manpower, developing entrepreneurship and catalysing industrial development in Punjab.

Keeping pace with the rapid advancements in technology in a fast changing world of information, the university had introduced a number of vocational courses to promote technology in the state. The objective was to train and motivate students for setting up their own small-scale units and upgrade their production technologies.

According to Prof. Randhawa the Guru Nanak Dev University Act lay more emphasis *inter alia* on teaching and promotion of research in applied sciences and technology. The university trains students in electronics, architecture, planning, food science, biotechnology, molecular biology, human genetics, applied physics, applied chemistry, sugar technology, printing technology, computer science, master of business administration and master of personnel management and industrial relations.

To cope with the needs of the food industry, the university had

introduced a new postgraduate course in food science and technology from the current academic session in the department of applied chemistry.

The recently established department of applied physics, would train manpower in material science, macro-electronics and renewable energy sources with proficiency in computer programme. Similarly, the centre for genetics disorder being run by the university had excellent infrastructure for carrying out research to detect various genetic disorders using molecular genetic techniques.

The institute of sugar technology was the latest addition to the faculty of applied sciences. Its main objective was to carry out time bound and result-oriented research on problems of the sugar industry in the region.

A well-equipped branch of science—bio-technology had been introduced to which admission was made on the basis of merit in the all-India Common Entrance Test conducted by Jawahar Lal Nehru University, New Delhi.

Talking about admissions, he said the university was the first one in this region to introduce the concept of "entrance test" for admission to all its postgraduate and graduate courses.

Autonomous Status for UDCT, Bombay

The Bombay University Department of Chemical Technology (UDCT) will soon be converted into a University Institute of Chemical Technology, with 12 full-fledged departments of its own. This was revealed by Dr. S.D. Kamik, Vice-

Chancellor, in Bombay recently. The university authorities have already cleared a proposal to this effect which is now awaiting the Chancellor, Mr. P.C. Alexander's approval.

The UDCT, which has already been enjoying functional autonomy from 1985, is rated among the world's finest research organisations. In terms of research output per faculty, the institute was ranked as "best in the world" in a global survey of chemical technology institutes conducted three years ago by Prof. J.T. Sommerfeld of the Georgia Institute of Technology in the U.S.

Last year, the UDCT set a record of producing 42 fresh Ph.Ds with just 45 research guides. Since 1940, the institution has produced 674 Ph.Ds many of whom are in high places in industry, academia and government administrations all over the world.

Currently, the UDCT has a student population of 1,024, a third of which are research students, including post-doctoral fellows. It has a faculty of 98, including 21 professors, 37 readers, 38 lecturers and 2 associate lecturers.

The UDCT's Director, Prof. M.M. Sharma, who incidentally, is the first engineer from India to be elected Fellow of the Royal Society, London, said his institution was fortunate in attracting the brightest students in India who worked extremely hard with an equally dedicated and talented band of teachers. A unique feature, Prof. Sharma said, was the close ties UDCT enjoys with the Rs. 30,000 crore turnover chemical industry, which contributes the highest per sector share—12.5

percent — of India's gross industrial production today.

Indeed, right from its inception 59 years ago, this co-operation has resulted in 84 trusts and endowments with a corpus of Rs. 1,453 crores. UDCT's ongoing research projects, sponsored by the government, industry and foreign universities amount to Rs. 3.5 crores and the department boasts one of the best-equipped libraries in the country. A unique feature of the library is sponsored endowments worth Rs. 40 lakhs with an annual recurring budget of Rs. 22 lakhs. These have largely helped UDCT absorb the escalating costs of subscriptions to international journals and maintain its research culture.

Prof. V.N. Gupchup, Pro-Vice-Chancellor, made a strong case for autonomy and the pursuit of excellence in education and also announced the proposed setting up of a computer network linking the university's campus at Kalina with UDCT and the Victoria Jubilee Technical Institute at Matunga. The network would be expanded later, Prof. Gupchup said, to include the university campus at Fort

17th Indian Social Science Congress

The President of the Indian Academy of Social Sciences, Prof. B.L. Amla, stressed the need for removing the existing contradictions between old beliefs and new aspirations of the people to involve everyone in the country in the mainstream of science and development. He was inaugurating the six-day 17th Indian Social Science Congress in Bangalore recently. Prof. Amla said these contradictions had led the people to view science and technology as an "imposition" on the social fabric

of the country because of which it was not adapted and assimilated in the Indian system.

Prof. Amla said the teaching of science and technology had yet to find a firm footing within the Indian social system. Corrective measures should be taken to bring everyone into the mainstream of science and development.

He stressed the need to bring into focus the thoughts and inputs required to accelerate the technological thrust for the formation of the Indian social system. He said stress should be laid on the subjects of creativity, technology, productivity and justice in the Indian context.

The Chairman, Organising Committee of the Congress, Mr. M.K. Panduranga Shetty, in his address voiced his opinion against the supreme court verdict on capitation fees and said it was detrimental to the progress of professional colleges. He appealed to the delegates to discuss the issue at length.

The deliberations of the Congress were conducted in five plenaries, 11 thematic panels, 20 sectional meetings, one symposium, group discussions and public lectures.

NRI Science Varsity

A non-resident Indian (NRI) proposal for setting up the first of a chain of National Science Universities (NSU) in India is under active consideration by the Ministry of Human Resource Development. The Ministry is reported to have set up a committee to evaluate the proposal and prepare a feasibility report. The committee that held its first meeting in New Delhi recently is headed by Prof. P.N. Srivastava, former Vice-Chancellor of the Jawaharlal Nehru

University. Other members of the committee are Mr. Gopi Arora, former Finance Secretary, Dr. P. Rama Rao, Secretary for Science and Technology Department, Dr. S.K. Joshi, Director-General of Council of Scientific and Industrial Research, Dr. S. Khan, an official in the Department of Education, and Dr. Swadesh Mahajan, a Physics Professor in the University of Texas in the United States who mooted the proposal.

Dr. Mahajan said that the model university would require a one-time grant of Rs. 100 crores from the government and its recurring expenses will be met by a trust to be created by NRI scientists in the US.

Dr. Mahajan said Indian scientists in the US were ready to contribute financially for the NSU and additionally make contributions of journals and books. They were also willing to spend time teaching and helping in research, he added.

"For science to flourish in India, nothing short of a fundamental change in structure of our institutions is needed, and cosmetic changes will not do," Dr. Mahajan said.

Explaining the concept of the NSU, he said, "it is the first and important step in a complete overhaul of our scientific establishment and the NSU would provide the most congenial atmosphere for teaching and research under a single roof".

According to Dr. Mahajan, India had made a mistake by separating universities from research institutes thereby preventing interaction of students with researchers. In the NSU science teaching and research will be "inextricably linked".

Workshop on 'Ergonomics'

A three-day national level workshop on "Ergonomics: Retrospective and Prospective" was recently organised under the auspices of the Department of Mechanical Engineering of Andhra University in Visakhapatnam.

Inaugurating the workshop, Dr. M. Gopalakrishna Reddy, Vice-Chancellor, Andhra University, observed that providing the right kind of environment and encouragement to the workers in any industry or office was important if both technical and mental efficiency were desired to be at the optimum level. He said that the human factors like love, affection and mental preparation played a key role in ensuring efficiency in work. Dr. Reddy said Ergonomics, which dealt with 'man managing the machine' was a holistic science and an atmosphere of love and affection was necessary for the proper functioning of the human machine.

Prof. N. Venkateswara Rao, Rector of Andhra University, explained the progress of industrial engineering and research in Ergonomics in the University.

About 50 delegates from various industries participated in the workshop. Dr. K.R. Divakara Roy was the co-ordinator of the workshop.

Incentive for Resource Generation

The Ministry of Human Resource Development is reported to have decided that resources generated by universities and colleges would not be adjusted against their grant allocation.

Under the existing system,

funds raised by a university are effectively treated as part of allocation by the government and an equal amount is deducted from the maintenance grant the following year. This was a disincentive for internal resource generation by colleges and universities.

The Chairman of the University Grants Commission (UGC), Prof. G. Ram Reddy, said, "It's a great initiative and the government deserves credit for it". The decision will further clear hurdles for universities willing to raise resources, Prof. Reddy said.

The "grant adjustment" issue figured prominently in the debate on financial crisis in universities during the past 18 months. The government's refusal to scrap the provision, despite repeated appeals by university vice-chancellors and the UGC, was seen as a major inconsistency in policy.

14 cr. German Aid for Anna Varsity

Under a joint Indo-German project, the Anna University has received a Rs. 14 crore German aid for the next three years, to specifically develop environmental studies and remote sensing. A sum of Rs. 8 crores is for environmental studies, while Rs. 6 crores will go towards programmes of the Institute of Remote Sensing (IRS).

Dr. M. Anandakrishnan, Vice-Chancellor, said the aim was to make changes in the engineering and science curricula. Major industries would be assisted in formulating their production operations with the objective of control or reduction of pollution.

The programmes would be started in early 1994, preceded by a national workshop in December

1993. The project provides for training of faculty and staff of the university in Germany, and acquisition of sophisticated equipment.

Symposium on 'Rotating Liquids'

One-day symposium on 'Rotating liquids' was recently held at the Department of Engineering Mathematics of Andhra University in Visakhapatnam.

Dr. M. Gopalakrishna Reddy, Vice-Chancellor, Andhra University, who was the chief guest at the inaugural session, said that the scientific researchers should be socially relevant and useful for community development. He lauded the research work done by Prof. Vidyanidhi and Prof. Nigam on the dynamics of liquid flowing between parallel walls in rapidly rotating systems. He also felicitated Prof. Vidyanidhi, a retired professor of Engineering Mathematics, Andhra University.

Prof. N. Venkateswara Rao, Rector, Andhra University, presided over the function. Prof. P. Gopalakrishnamurthy, Department of Engineering Mathematics, explained the objectives of the symposium and Prof. V.V. Ramana Rao, Department of Applied Mathematics, delivered the keynote address on the state of research on 'Rotating Liquids' in Andhra University.

INSA Awards

Thirteen scientists, including an American, have been selected by Indian National Science Academy (INSA) for its 1993 academy awards for outstanding contributions to research.

Dr. E.S. Rajagopal, Director of the National Physical Laboratory, New Delhi, will receive the

Homi Jehangir Medal for his contributions to fluid mixture systems and glassy semi-conducting alloys.

Dr. S.K. Sinha, Director of the Indian Agricultural Research Institute, New Delhi, will receive the Sunder Lal Hora Medal for his contribution to the understanding of drought resistance and adaptation of crops to stress.

Dr. D.K. Dutta, of the Indian Statistical Institute, Calcutta, has been selected for the Prashanta Chandra Mahalanobis Medal for his work in image processing and computer memory.

The Kalapathu Ramakrishna Ramanathan Medal will go to Dr. P.K. Das, former Director-General of the Indian Meteorological Department for his work on prediction of storm surges in the Bay of Bengal.

Professor J.P. Ostriker of Princeton University, in the US, has been selected for the INSA-Vainu Bapu Memorial Award for his work in astrophysics.

The Shyam Bahadur Saksena Memorial Award will go to Prof S.P. Ravichandhuri of New Delhi for contributions in the area of plant diseases.

The awards will be presented at the general meeting of the INSA in December 1993.

According to INSA sources, Dr. H.D. Tandon of New Delhi has been awarded the T.S. Tirumurti Memorial Endowment Lecture for his contributions in the field of gastroenterology.

Prof. Asis Datta of the Jawaharlal Nehru University, New Delhi, has been selected for the Dr. Nitya

Nand Endowment Lecture for his work on biochemistry.

Prof. B.R. Nag of the Institute of Radio Physics and Electronics, Calcutta, will receive the INSA prize for materials science, Dr. P.S. Shastri, of the Indian Institute of Science, Bangalore, will receive the Bires Chandra Guha Memorial Lecture Award and the Shambu Nath De Memorial Lecture Award goes to Dr. N.K. Ganguli of the Post Graduate Institute of Medical Education and Research, Chandigarh.

Dr. Neena Goyal of the Central Drug Research Institute, Lucknow, will receive the L.S.S. Kumar Memorial Award for her work on filarial and bookworm parasites.

Japanese Aid for IGNOU

Japan is reported to have extended a grant-in-aid of 1,597 million Yen (approximately Rs. 46 crore) to the Indian Government for improvement of educational media production facilities at the Indira Gandhi National Open University, New Delhi.

The proposed new audio-visual infrastructure will meet the growing demand for audio-visual programmes for a wide range of courses being conducted by the University.

Official documents to this effect were exchanged between the Finance Secretary, Mr. Montek Singh Ahluwalia, and the Ambassador of Japan to India, Mr. Chusei Yamada in New Delhi recently.

News from Agricultural Universities

Two New Agricultural Colleges

The Vice-Chancellor of Punjab Agricultural University, Dr. Khem Singh Gill, said that the Punjab Government had decided to set up a college of agriculture at Faridkot to meet the aspirations of the people of the area and to provide farm education to rural students. A sum of Rs. 1.70 crore has been sanctioned for this purpose. Besides the I.C.A.R. will also provide funds for the same.

In addition to this, the government has also sanctioned the establishment of an institute of agriculture at Gurdaspur under which a two-year diploma in agriculture with diversified area would be offered to 30 students with plus two as the basic qualification.

The Vice-Chancellor further

said that the university had been sanctioned eight research projects with budget allocation of Rs. 124.51 lakh in the past three months.

One of the projects for Rs. 49.60 lakh will be used to equip university research stations with advanced technology which will help scientists to carry out research activities with speed and efficiency.

Another important project relates to the development of sericulture technology under sub-tropical conditions. This project amounting to Rs. 20.18 lakh has been sanctioned by the Central Silk Board.

Still another project at a cost of Rs. 35.81 lakh relates to the development of integrated pest management (IPM) packages

under selective crop conditions.

According to Mr. Kulbir Singh, Registrar, the university has introduced a two-year diploma course in agriculture for the first time this year. The university already conducts the B.Sc. Agriculture (Honours), a four-year course.

WB, FAO Experts Visit HAU

Three experts — one from World Bank and two from F.A.O. recently visited the Chaudhary Charan Singh Haryana Agricultural University (CCSHAU) to review the progress of research and extension work being done at the university and assess the capabilities of the university to further carry out the research and extension work according to the changing demands of the time. The experts visited the research farm, farmers' field, saw the laboratories and held detailed discussion with the leading farmers of adjoining villages.

In a meeting held with the Vice-Chancellor, Dr. S. Arya and senior scientists of the university, the visiting experts highly appreciated the efforts made by the researchers and the extension personnel of the university for the betterment of agriculture in Haryana.

Dr. S. Arya explained to the visiting team the administrative set up and three-fold mandate of the university. Mr. Peter F. Rayan from World Bank emphasised the need for developing fastest communication system and examination of human resource development project sanctioned by the World Bank for improving the quality of graduates and knowledge of the scientists.

Symposium on Nematodes Management

A two-day national symposium on Recent Approaches in Integrated Nematodes Management was recently held at Chaudhary Charan Singh Haryana Agricultural University (CCSHAU). Over 150 delegates from all over India who discussed the scenario of the existence of plant nematological problems were of the view that several new pests and disease problems had cropped up with the availability of conducive environment. Hence there was an urgent need to keep a strict vigil to monitor plant protection status in the areas witnessing rapid

agricultural changes. The growers must be provided alternative technology based on the ecologically sound and economically viable method, they felt.

The symposium, held in collaboration with Nematological Society of India, was inaugurated by Dr. B. R. Mor, Dean, College of Agriculture. In his address, Dr. Mor said that though ecologically safe and effective practices of nematodes management had been identified and standardised in several cases yet cultural practices like deep summer ploughing, summer solarization and plastic mulching deserved special mention.

News from Abroad

China : Independent Varsities on the Anvil

The Chinese government is reported to have given its approval for setting up of the country's first independent universities and colleges in the two major cities of Shanghai and Guangzhou. Applications from overseas institutions to set up Chinese branches are now being welcomed.

Endorsement of the plans by the state education commission was greeted with a flood of applications from across the country as well as from the United States, Canada and Australia.

Approval for two colleges of higher education have already been given in Guangzhou, Guangdong Province, and 26 other applications are currently being considered by an approval committee for higher learning institutions. A new degrees committee has also been established.

In Shanghai several Hong Kong companies are combining with

Shanghai University's international business institute to set up a number of schools of higher education around the city.

Classes in international business subjects, construction and engineering have already commenced. Courses in finance, real estate, information and high technology are to follow shortly.

The reform measures come after mounting pressure from business and industry for more and better trained personnel to meet the demands of the city's rapidly growing economy. New measures in Guangzhou and Shanghai include an overall reform of the education system which aims to open wider channels for investment in education.

At the same time greater autonomy will be granted to the managements of state-run universities and colleges, and a standardised system of student credit

accumulation will be introduced.

Shangdai University, the first private university to be set up in Shanghai, has already enrolled 230 students, and is planning to admit a further 300 in the autumn.

Shanghai urgently requires specialists in a broad range of fields relevant to the building of an international financial and commercial centre.

The mayor of Shanghai, Huang Ju, said the old education system was simply unable to keep pace with the country's socialist market economy.

He said he represented a growing school of thought that at this time educational spending should increase faster than the gross domestic product and should approach the figure of 20 percent of total annual treasury spending.

Arterial Disease of Legs & Heart

A study conducted in Scotland has indicated that arterial disease in the legs is similar to the disease which can affect arteries in the heart. Both are caused by atheroma, fatty deposits in the wall of the artery. So studying the disease in the legs can produce useful information on the causes and risks of heart attacks.

Over the past five years the Edinburgh Artery Study has been investigating a wide range of factors connected to the origin and development of arterial disease. The study, involving 1,600 men and women aged 55 to 74 selected at random from the city's general population, has revealed that the genetic make-up of individuals influences clotting factors in the blood and also affects the risks of

developing arterial disease in the legs.

Cigarette smoking has also been found to be a particularly important risk factor for disease in the legs compared to the heart. This may be linked to the products of cigarette smoke damaging artery walls, and increasing the stickiness of the blood.

Researchers at Edinburg University's Wolfson Unit for Prevention of Peripheral Vascular Diseases have now won funding of £634,000 from the British Heart Foundation to continue the study for another five years.

Their main aim is more accurate prediction of the onset of heart attacks, and identifying blood factors causing worsening of disease in the arteries. A DNA databank will be set up as part of the project to help determine the possible role of genetic makeup in causing disease

The researchers will also investigate the differences between men and women as regards risk factors, so that better advice can be given on the importance of preventive measures such as stopping smoking and taking exercise.

John Prosser, Scottish director of the British Heart Foundation, said: "We are pleased to help fund this research, which is of particular significance to Scotland, where heart and circulatory disease is a serious problem."

Food from Waste Crops

A collaboration between researchers at Reading University and a small engineering firm in Lichfield in England, promises to result in money-spinning technology to convert wheat and barley

straw into food for animals and humans. The machine will be especially welcomed by British farmers who can no longer burn their waste straw because of pollution laws that came into force this year.

The machine uses new milling technology developed by researchers at the university's department of food studies in collaboration with the firm, Skyway Technology. Peter Vallance, industrial liaison officer at Reading University, says that the machine allows the straw to be processed into a powder. In addition to being made into food, the powder could also be used as fuel or compost. Solvent absorption is another possible use for the powder

In particle form, the breakdown of straw and extraction of substances is more efficient. For the chemical industry, this could open up the possibility of extracting chemicals such as lignin, sugars and alcohols

But Mr. Vallance says that the initial drive for the project, which is funded by the Teaching Company Scheme, was the national ban on straw burning. British farmers are estimated to have burnt around five million tonnes of straw a year up to now.

Carolyn Punter, the TCS Associate carrying out the research is also looking into using the technology to convert other cereal crops, such as sorghum and millets. Sorghum is a cereal that can be grown in extreme conditions, making it ideal for countries continually threatened by famine. But it has a bitter-tasting outer layer which makes it unpalatable to humans. The technology being developed by Ms. Punter and her colleagues could be capable of

removing this layer so that an edible flour can be produced. If the work is successful, a portable version of the milling machine will be developed for third world countries.

Reliance on Essays Questioned

The Essay – that staple of the humanities student's university career – is being challenged as a means of developing the skills and qualities employers demand of their recruits.

Researchers at the University of Hull, England, have entered the debate about the future of the essay with an attack on the position it occupies at the heart of arts syllabuses.

Sally Mitchell, research fellow in the education department, says that case studies of first-year English and Sociology undergraduates threw up just how much emphasis was placed on the essay form

Writing in the summer newsletter of the Council for University English, she says the model is "highly questionable. Far wider and richer experiences of thinking and writing can be made available to students with no less intellectual rigour."

Teachers should start to question their frequent reliance on essays "as the test of their students' engagement and learning," she says. She suggests setting students different kinds of tasks, including:

- * "unfinished" writing, such as outlines of ideas and arguments which can then be discussed at tutorials;

- * analysis of the processes involved in writing an essay expressed in note or prose form;

- * investigative writing which may not reach a conclusion.

Ms Mitchell says that her project, on "The Teaching and Learning of Argument in Sixth Forms and Higher Education" – was about trying to understand and describe what went on in learning situations and making suggestions for changes. It has been funded by the Leverhulme Foundation

"There is a big debate going on at the moment about the essay form. It is being challenged but there is resistance to any change because it has such an important place, particularly in a subject like English. It is associated with ideas of literacy and culture – to be a literate, civilised person is closely associated with being able to turn out an essay."

But using a variety of spoken and written forms to test students' knowledge and understanding created more flexible students. "This is what employers are looking for". The project, which is led by Dr. Richard Andrews, senior lecturer in education at Hull, is to be completed next summer.

New C'wealth Scheme for Students

The Commonwealth has launched a new scheme designed to encourage university students from the industrialised countries of the Commonwealth to complete part of their course in the developing world. The scheme was inaugurated recently in London at a meeting of university Vice-Chancellors from leading Commonwealth countries, including India, presided over by the Commonwealth Secretary-General Mr Emeka Anyaoku.

Mr. Anyaoku said, the Commonwealth Universities Study Abroad Consortium was a significant

step in promoting the interchange of students within the Commonwealth and, in particular, the flow of students from the developed to the developing countries.

Awards for Study in Britain

A revised edition of 'Awards for Study in Britain: A guide' published by the British High Commission, British Council Division is available for all those wishing to pursue a course of study or research in the United Kingdom.

The guide, listing over 150 awards schemes, contains information on scholarships and fellowships from the undergraduate to the postdoctoral levels. An introductory chapter gives general information on entrance requirements, the procedure for applying for undergraduate and postgraduate courses, and living in Britain like costs, accommodation and health.

It also provides the addresses of higher education institutions in the United Kingdom.

Copies of the guide are available from the British High Commission, British Council Division, 17 Kasturba Gandhi Marg, New Delhi 110 001 for Rs. 25/- (Rs. 35/- by post).

We Congratulate ...

Dr. K.L. Chakraborty who has been appointed Vice-Chancellor of the Tripura University, Agartala.

Forthcoming Events

1993

October 7-9

Warsaw, Poland

Conference on Changes in the Systems of Higher Education in Central European Countries: Reforms, Results, Trends.

Organized by:- *Warsaw Centre for Science Policy - East West Science Centre. University of Kassel*

For further information Warsaw University, ul Nowy Swiat 69, 00-046, Warsaw, Poland. Tel +[48] 22 26 07 46 // Electronic mail CRPH Ea Plearn

October 31 - November 4

Trieste, Italy

Sixth General Meeting and Tenth Anniversary Celebrations.

Organized by - *Third World Academy of Sciences (TWAS) c/o International Centre for Theoretical Physics (ICTP)*

Miramare, Strada Costiera 11, P O Box 586, 34126, Trieste, Italy Telex 460392 ICTPI // Tel + [39] 40 2240-1 // Telefax +[39]40 224559 // electronic mail twasaictp trieste it

November 15-19

Tokyo, Japan

Kyoto, Japan

Fifty-second Meeting of the IAU Administrative Board. Ninth IAU Round Table on the Role of Universities in the Twenty first Century.

Organized by - *International Association of Universities (IAU)*

For further information Dr Serge Laponinte, Executive Secretary, International Association of Universities, 1, rue Miollis, 75732, Paris Cedex 15, France. Tel. +[33] 1 45 68 25 45 // Fax +[33] 1 47 34 76 05

November 22-25

Lagos, Nigeria

AFRICEET'93: First International Conference on Continuing Engineering Education and Training in Africa.

Organized by:- *AFRICEET'93-African Network of Scientific and Technological Institutions (ANSTI)*

For further information Dr. A.N. Nzeako, AFRICEET'93. University of Nigeria. Department of Electronic Engineering, Nsukka, Nigeria Telex. 51496 ulons nq // Tel.. + [234] 42771 911 ext. 129

November 22-25

Kowloon, Hong Kong

Annual Conference on Economics of Distance Education.

Organized by:- *Asian Association of Open Universities (AAOU)*

For further information The Programme Chairman, The Open Learning Institute of Hong Kong, 9-13/F, Trade Department Tower, 700 Nathan Road, Mongkok, Kowloon, Hong Kong

November 23-25

Geelong, Victoria, Australia

RIDE'93 Research in Distance Education.

Organized by:- *Deakin University Institute of Distance Education*

For further information. Terry Evans, RIDE'93 Seminar, Institute of Distance Education, Deakin University, Geelong, Victoria 3217, Australia Tel +[61]52271164 // Fax + [61] 52 272177

December 6-8

Paris, France

Seminar on Quality Management and Quality Assurance in OECD

Member Countries.

Organized by:- *Institutional Management in Higher Education (IMHE) Programme OECD*

For further information: IMHE Programme, OECD, 2, rue Andre Pascal, 75775, Paris Cedex 16, France. Tel.: + [33] 1 45249264

December 14-16

Brighton, United Kingdom

Annual SRHE Conference on Governments and the Higher Education Curriculum: Evolving Partnerships.

Organized by:- *Society for Research Into Higher Education (SRHE)*

For further information: The Conference co-ordinator, Prof Tony Becher, EDB, University of Sussex, Falmer, Brighton BN1 9RG, United Kingdom

1994

June

Vienna, Austria

Conference on University and Society: Higher Education and its Relationship to Social Change.

Organized by - *University of North Carolina at Chapel Hill*

CB# 9100, 02 South Building, Chapel Hill, N C. 27599-9100, USA Tel +[1] 919 962-1365 // Telefax + [1] 919 962-1647- Wirtschafs Universitat Wien

August 12-14

Jyvaskyla, Finland

Biennial Congress of the International Association of the Third Age Universities.

Organized by:- *International Association of the Third Age Universities*

For further information Jyvaskyla Congresses, University of Jyvaskyla, P O. Box 35, SF-40351, Jyvaskyla, Finland

(Source IAU Bulletin, June 1993)

News from UGC

Academic Staff Colleges - Schedule of Refresher Programmes during 1993-94

The University Grants Commission has identified about 323 University Departments/Institutions to conduct subject-oriented refresher programmes in Sciences, Humanities and Social Sciences during 1993-94 for in-service teachers with more than five years of continuous service as Lecturer in Universities and Colleges. While 85-90 per cent of the teachers will be enrolled from the catchment area of the notified centres, 10-15 per cent of teachers will be from any University or College on All-India basis. Teachers selected for the courses are to be treated as on duty with full pay and allowances by the sponsoring authority/college.

The host institution will provide lodging and boarding to outstation participants and TA will be paid to them as per ASC rules. In case any University is unable to make lodging and boarding arrangements, DA will be paid in cash to the participants.

The schedule of refresher courses during 1993-94 as received from the Universities/Institutions, is indicated below.

S. No.	Name of the University/ Institution	Proposed schedule for 1993-94	Catchment Area (Region)	I	II	III	IV
I	II	III	IV				
1.	Chemistry						
	Calcutta University	28-09-93 to 19-10-93 02-02-94 to 22-02-94	East (West Bengal)		Hyderabad University	27-09-93 to 20-10-93 31-01-94 to 26-02-94	South (Andhra)
	Aligarh University	30-09-93 to 24-10-93 01-02-94 to 27-02-94	U.P.		Madras University	24-11-93 to 21-12-93 02-02-94 to 01-03-94	South (Tamilnadu & Pondicherry)
	Poona University	08-09-93 to 05-10-93	West (Maharashtra)		Goa University	12-10-93 to 02-11-93 01-03-94 to 22-03-94	West (Goa & Karnataka)
	Karnataka University	04-01-94 to 24-01-94	Karnataka		Utkal University	Oct 93	Orissa
	Patna University	08-11-93 to 27-11-93 03-01-94 to 22-01-94 07-03-94 to 26-03-94	East (Bihar)		Mysore University	01-09-93 to 28-09-93 04-10-93 to 30-10-93 03-11-93 to 30-11-93 01-12-93 to 28-12-93	Karnataka
	Rajasthan University	06-09-93 to 25-09-93 08-02-94 to 27-02-94	Rajasthan		A.P.S. University, Rewa	18-10-93 to 12-11-93 11-01-94 to 04-02-94	M.P.
	Delhi University	01-10-93 to 21-10-93 07-11-93 to 28-11-93 28-12-93 to 12-01-94 01-02-94 to 21-02-94	All India		Cochin University of Science & Technology	September, 1993 November, 1993 February, 1994	South (Kerala & Tamilnadu)
	Dev Ahilya University	03-01-94 to 29-01-94 07-02-94 to 05-03-94	M.P.		Lucknow University	01-11-93 to 30-11-93	Need Based
	Andhra University	02-11-93 to 27-11-93 01-03-94 to 26-03-94	South (Andhra)		Dibrugarh University	02-11-93 to 22-11-93 18-01-94 to 07-02-94	North East
	Bharthidasan University	October, 1993 March, 1994	South (Tamilnadu)		Sri Venkateswara University	03-01-94 to 22-01-94	Andhra
	Kerala University	04-10-93 to 25-10-93 30-12-93 to 20-01-94	South (Kerala, Tamilnadu & Pondicherry)	4.	Bio-Physics		
	North Eastern Hill University	Schedule awaited		4 (a)	Environmental Science		
	Cochin University	October, 1993 January, 1994	South (Kerala, Tamilnadu & Pondicherry)		Ranchi University	February, 1994	Need Based
	Kashmir University	25-10-93 to 14-11-93	North		Andhra University	01-02-94 to 26-02-94	Need Based
	Punjab University	16-09-93 to 13-10-93 07-12-93 to 03-01-94 01-03-94 to 28-03-94	North		A.P.S. University, Rewa	17-11-93 to 10-12-93 08-02-94 to 01-03-94	M.P.
2.	Bio-Chemistry			5	Bio-Science		
	Delhi University	05-10-93 to 28-10-93 20-12-93 to 08-01-94	All India		Rani Durgawati University	06-12-93 to 24-12-93	M.P. & Bihar
3.	Physics				H.P. University	01-11-93 to 20-11-93	North & U.P.
	Poona University	08-09-93 to 05-10-93 11-10-93 to 08-11-93 14-01-94 to 10-02-94	West		Madurai Kamraj University	20-09-93 to 13-10-93	South East
	Karnatak University	07-09-93 to 27-09-93 28-01-94 to 17-02-94	Karnataka	6.	Botany		
	Bihar University	22-11-93 to 12-12-93 01-02-94 to 21-02-94	Bihar		Karnatak University	22-02-94 to 14-03-94	Karnataka & Kerala
	Rajasthan University	06-09-93 to 25-09-93 22-11-93 to 11-12-93	Rajasthan		Rajasthan University	27-09-93 to 16-10-93	Rajasthan
	B.H.U.	31-01-94 to 19-02-94	U.P.		Banaras Hindu University	29-11-93 to 18-12-93	U.P. & M.P.
	Delhi University	20-12-93 to 08-01-94	North		Omania University	10-11-93 to 04-12-93	South (Andhra)
	Rani Durgawati University	08-12-93 to 24-12-93 08-02-94 to 27-02-94	M.P.		Bihar University	22-11-93 to 12-12-93 11-01-94 to 31-01-94 11-03-94 to 31-03-94	East (Bihar)
	Gorakhpur University	05-10-93 to 25-10-93 04-12-93 to 24-12-93	U.P. & Bihar		Hyderabad University	02-11-93 to 30-11-93 14-02-94 to 11-03-94	South (Maharashtra & Kerala)
					Madras University	01-12-93 to 28-12-93	South (Tamilnadu & Pondicherry)
					Utkal University	Oct. 93	Need Based
					North Eastern Hill University	20-09-93 to 11-10-93	North East
					Kashmir University	22-11-93 to 17-12-93 07-02-94 to 27-02-94	North
					Punjab University	22-09-93 to 19-10-93	North
					Lucknow University	01-10-93 to 30-10-93 01-01-94 to 30-01-94	U.P.
					Sri Venkateswara University	22-11-93 to 11-12-93 07-03-94 to 26-03-94	Andhra, Kerala

I	II	III	IV
7.	Zoology		
	Karnatak University	10-12-83 to 30-12-83	South (Karnataka)
	Rajasthan University	27-09-83 to 18-10-83	North & Rajasthan
		11-01-84 to 30-01-84	
	Banaras Hindu University	27-09-83 to 18-10-83	North & U.P.
	Oermania University	17-01-84 to 11-02-84	South (Andhra) & West (Maharashtra)
	Burdwan University	01-12-83 to 21-12-83	East (West Bengal)
	Bihar University	07-09-83 to 27-09-83	East (Bihar)
		02-12-83 to 22-12-83	
		01-02-84 to 21-02-84	
	Andhra University	04-10-83 to 29-10-83	South (Andhra)
		03-01-84 to 29-01-84	
	Gorakhpur University	01-11-83 to 21-11-83	U.P.
		01-02-84 to 21-02-84	
	Madras University	02-09-83 to 29-09-83	South (Tamilnadu & Pondicherry)
		20-01-84 to 18-02-84	
	Gujarat University	09-12-83 to 29-12-83	West (Gujarat)
	Kerala University	29-07-83 to 19-08-83	South (Kerala)
		24-01-84 to 14-02-84	
	North Eastern Hill University	06-11-83 to 26-11-83	North East
		14-02-84 to 07-03-84	
	Lucknow University	01-09-83 to 30-09-83	U.P.
		01-12-83 to 30-12-83	
		(i) Dec. 83 (ii) Feb. 84	Orissa
8.	Mathematics		
	Poona University	17-11-83 to 14-12-83	West (Maharashtra & Gujarat)
		15-12-83 to 11-01-84	
	Calicut University	December, 1983	South (Kerala & Pondicherry)
	Delhi University	10-10-83 to 31-10-83	North (Rajasthan)
		21-12-83 to 12-01-84	
		01-02-84 to 21-02-84	
	Rani Durgawati University	25-11-83 to 15-12-83	M.P.
		22-02-84 to 14-03-84	
	Alahabad University	27-09-83 to 22-10-83	U.P.
		20-12-83 to 14-01-84	
	Burdwan University	13-01-84 to 02-02-84	East (West Bengal) & Bihar
	Bharthidasan University	October, 1983	Tamilnadu
	Aligarh Muslim University	07-02-84 to 05-03-84	U.P.
	Roorkee University	30-08-83 to 19-09-83	North U.P.
		29-11-83 to 19-12-83	
	Institute of Science, Bombay	11-10-83 to 08-11-83	West
		21-02-84 to 21-03-84	
	Punjab University	16-09-83 to 13-10-83	North
		07-12-83 to 03-01-84	
		01-03-84 to 28-03-84	
	Lucknow University	01-09-83 to 30-09-83	U.P. & Bihar
		01-12-83 to 30-12-83	
	Utkal University	(i) Dec. 83	Orissa & West Bengal
		(ii) March 84	
9.	Statistics		
	Bharathiar University	05-10-83 to 25-10-83	Tamilnadu & Pondicherry
		08-12-83 to 28-12-83	
		17-01-84	All India
	Indian Statistical Institute, Calcutta		
	Gujarat University	20-09-83 to 11-10-83	West (Gujarat)
		10-01-84 to 31-01-84	
	Gauhati University	Nov/Dec, 1983	North East
		Jan/Feb, 1984	
		March, 1984	
	Sardar Patel University	04-10-83 to 23-10-83	West (Gujarat & Maharashtra)
		01-03-84 to 30-03-84	
	Cochin University of Science & Technology	06-12-83 to 31-12-83	Kerala
	Sri Venkateswara University	01-03-84 to 26-03-84	Andhra
		11-10-83 to 30-10-83	
		14-02-84 to 05-03-84	
10.	Geology & Geo-Physics		
	Mysore University	22-11-83 to 18-12-83	Karnataka, Tamilnadu & Maharashtra
		17-01-84 to 12-02-84	

I	II	III	IV
	Aligarh Muslim University	24-09-83 to 22-10-83	U.P., M.P. & Bihar
	Punjab University	03-01-84 to 02-02-84	North Rajasthan
		14-09-83 to 11-10-83	
		14-01-84 to 10-02-84	
	Guru Nanak Dev University	November, 1983	West (Maharashtra & Gujarat)
		March, 1984	
11.	Earth Science		
	Bharthidasan University	Sept., 1983 Feb. 1984	All India
12.	Anthropology		
	Hyderabad University	29-11-83 to 24-12-83	South (Andhra, Tamilnadu & Kerala)
			Bihar
	Ranchi University	Nov./Dec. 1983	North & U.P.
	Lucknow University	15-09-83 to 14-10-83	
		01-02-84 to 29-01-84	
	Utkal University	(i) Oct. 83	Orissa, North East & West Bengal
		(ii) Feb. 84	
13.	Microbiology		
	Poona University	15-12-83 to 11-01-84	West (Maharashtra & Gujarat)
		18-02-84 to 17-03-84	
	Rani Durgawati University	06-09-83 to 24-09-83	M.P., Bihar, North, North-East
		07-02-84 to 28-02-84	West
	Institute of Science, Bombay	06-12-83 to 02-01-84	
	Madurai Kamaraj University	22-11-83 to 15-12-83	South (Tamilnadu, Andhra & Kerala)
14.	Life Science		
	Devi Ahilya University	20-09-83 to 16-10-83	M.P.
		28-02-84 to 26-03-84	
	Guru Nanak Dev University	02-03-84 to 22-03-84	North, Rajasthan
	Madurai Kamaraj University	25-10-83 to 17-11-83	South
15.	Home Science		
	Institute of Home Economics, New Delhi	27-09-83 to 15-10-83	North
		27-09-83 to 15-10-83	(two courses simultaneously)
		20-12-83 to 14-01-84	
		20-12-83 to 14-01-84	
16.	Computer Application		
	Poona University	17-11-83 to 14-12-83	West
	Rani Durgawati University	22-11-83 to 11-12-83	All India
		14-03-84 to 02-04-84	
	Mysore University	28-10-83 to 20-11-83	South (Karnataka & Kerala)
		22-11-83 to 18-12-83	
	Jawahar Lal Nehru University	01-11-83 to 26-11-83	North
	Hyderabad University	06-12-83 to 31-12-83	South (Andhra & Tamilnadu)
		21-02-84 to 19-03-84	
17.	Economics		
	Guru Nanak Dev University	20-12-83 to 09-01-84	North, Rajasthan
	Jawahar University	04-02-84 to 28-02-84	M.P.
	Institute for Social & Economic Changes, Bangalore	02-11-83 to 29-11-83	Karnataka
		03-01-84 to 30-01-84	
	Gokhale Institute of Politics & Economics	30-08-83 to 18-09-83	Maharashtra
		20-09-83 to 09-10-83	
		11-10-83 to 30-10-83	
	Saurashtra University	13-09-83 to 02-10-83	Gujarat
		10-01-84 to 29-01-84	
	Bihar University	09-09-83 to 29-09-83	Bihar
		11-01-84 to 30-01-84	
	Mysore University	17-01-84 to 12-02-84	Karnataka
	Kashmir University	16-12-83 to 09-01-84	North
		03-03-84 to 30-03-84	
	Devi Ahilya University	22-11-83 to 18-12-83	M.P.
		28-02-84 to 26-03-84	
	Gorakhpur University	04-12-83 to 24-12-83	U.P.
		05-02-84 to 25-02-84	
	Jai Narayan Vyas University	29-08-83 to 19-09-83	Rajasthan
		21-02-84 to 13-03-84	
	Jawaharlal Nehru University	14-02-84 to 11-03-84	North
	Bharathiar University	05-10-83 to 25-10-83	Tamilnadu
		08-01-84 to 28-01-84	

I	II	III	IV
	Gauhati University	November, 1993	North-East
	Kerala University	February, 1994	
	Sardar Patel University	05-09-93 to 27-09-93	Kerala
	A.P.S. University, Raen	28-12-93 to 18-01-94	
	Sti Venkateswara University	29-11-93 to 18-12-93	Gujarat
	Sociology	21-09-93 to 14-10-93	M P
	Marathwada University	14-12-93 to 07-01-94	
	Bharathidasan University	08-03-94 to 31-03-94	Andhra
	Gorakhpur University	01-11-93 to 20-11-93	
18.	Marathwada University	Schedule awaited	
	University	November, 1993	South (Tamilnadu & Pondicherry)
	Gorakhpur University	10-12-93 to 30-12-93	U P
	J.N.U.	12-02-94 to 04-03-94	
	Gujarat University	29-11-93 to 24-12-93	North
	Lucknow University	20-10-93 to 09-11-93	West (Gujarat & M P.)
		05-03-94 to 25-03-94	
		01-09-93 to 30-09-93	U P & Bihar
		01-02-94 to 28-02-94	
19.	Social Work	Schedule awaited	
	Rajasthan University	13-09-93 to 01-10-93	Need Based
	Andhra University	08-11-93 to 27-11-93	South (Tamilnadu, Pondicherry, Kerala)
	Madurai Kamaraj University	11-10-93 to 30-10-93	West, Maharashtra, Karnataka, Gujarat
	Tata Institute of Social Sciences, Bombay	01-02-94 to 21-02-94	
20.	History		
	Marathwada University	13-12-93 to 08-01-94	Need Based
	Kurukshetra University	01-12-93 to 21-12-93	North
	Karnatak University	01-03-94 to 21-03-94	
		15-11-93 to 05-12-93	Karnataka & Maharashtra
		01-03-94 to 21-03-94	South (Karnataka)
	Mysore University	28-10-93 to 20-11-93	Rajasthan
	Jai Narayan Vyas University	22-11-93 to 11-12-93	
	Pondicherry University	24-01-94 to 12-02-94	South (Tamilnadu & Pondicherry)
	J.N.U.	03-09-93 to 24-09-93	North
	Hyderabad University	04-01-94 to 24-01-94	South (A.P.)
		28-11-93 to 24-12-93	
		13-09-93 to 08-10-93	South (Tamil Nadu)
		01-02-94 to 28-02-94	
	Madras University	13-09-93 to 21-10-93	
		23-02-94 to 22-03-94	
	Aligarh Muslim University	07-02-94 to 05-03-94	U.P. & M P
	Gauhati University	30-03-94 to 28-04-94	
	North Eastern Hill University	January, 1994	Need Based
		27-11-93 to 18-12-93	North East
		08-03-94 to 28-03-94	
	Kashmir University	12-01-94 to 01-02-94	North
		03-03-94 to 20-03-94	
	Calcutta University	04-11-93 to 25-11-93	East (West Bengal & Bihar)
		12-02-94 to 05-03-94	
	Aligarh Muslim University	27-09-93 to 23-10-93	U.P. & Bihar
		04-12-93 to 30-12-93	
	Utkal University	(i) Oct to Nov 93	Orissa, M P
		(ii) Feb. to Mar 94	
21.	Philosophy		
	Rajasthan University	22-11-93 to 11-12-93	North & Central
		14-03-94 to 02-04-94	
	Banaras Hindu University	03-01-94 to 22-01-94	U.P. & Bihar
	Rani Durgawati University	03-09-93 to 30-09-93	M.P.
		03-01-94 to 23-01-94	
		31-03-94 to 20-04-94	
	Gauhati University	Sept/Oct., 1993	North-East
	Nagpur University	September, 1993	West (Goa, Maharashtra)
		February, 1994	Karnataka
	Calcutta University	13-09-93 to 06-10-93	East (West Bengal)
		14-02-94 to 07-03-94	Orissa

I	II	III	IV
	Utkal University	Sept., 93	Need Based
22.	Library Science		
	Poona University	08-09-93 to 05-10-93	West (Maharashtra & Goa) M.P.
	Aligarh Muslim University	03-01-94 to 02-02-94	North/Bihar/Central
	Mysore University	20-12-93 to 13-01-94	Need Based
23.	Commerce		
	Aligarh Muslim University	22-09-93 to 15-10-93	U.P. & Bihar
		01-12-93 to 24-12-93	
	Marathwada University	10-01-94 to 05-02-94	West (Maharashtra)
	Saurashtra University	11-10-93 to 02-11-93	West (Gujarat, Maharashtra)
		07-02-94 to 26-02-94	
	Burdwan University	01-03-94 to 21-03-94	East
	Devi Ahilya University	22-11-93 to 18-12-93	M P
	Andhra University	07-02-94 to 05-03-94	
	Jai Narayan Vyas University	29-11-93 to 28-12-93	South (Andhra)
		21-09-93 to 10-10-93	Rajasthan
	Dr H.S. Gaur University	01-11-93 to 20-11-93	
		20-12-93 to 09-01-94	M P
	Mysore University	07-03-94 to 26-03-94	
	Bharathiar University	14-02-94 to 12-03-94	Need Based
		01-09-93 to 21-09-93	Tamil Nadu & Pondicherry
		08-12-93 to 28-12-93	
	Gujarat University	06-02-94 to 27-02-94	West (Gujarat)
	Kashmir University	07-02-94 to 27-02-94	North
	Sri Venkateswara Univ	24-01-94 to 12-02-94	(Need Based)
24.	Political Science		
	Banaras Hindu University	01-11-93 to 20-11-93	U.P.
	Berhampur University	Oct., 1993, Dec., 1993	Orissa
	Omania University	07-09-93 to 01-10-93	A.P.
	Burdwan University	04-11-93 to 21-11-93	West Bengal
		05-02-94 to 28-02-94	
	Bihar University	15-09-93 to 05-10-93	Bihar
	Jai Narayan Vyas Univ	14-02-94 to 05-03-94	Rajasthan
	Jawahar Lal Nehru University	17-01-94 to 11-02-94	North
	Madras University	23-09-93 to 21-10-93	Tamilnadu & Pondicherry
	Gauhati University	September, 1993	North East
		December, 1993	
		February, 1994	
	Kerala University	06-10-93 to 27-10-93	Kerala
		01-03-94 to 22-03-94	
	Goa University	16-11-93 to 07-12-93	Goa & Maharashtra
		04-02-94 to 25-02-94	
	Meerut University	September, 1993	U.P.
		December, 1993	
		Feb/March, 1994	
	Vikram University	20-10-93 to 10-11-93	M P
		01-03-94 to 20-03-94	
		08-12-93 to 04-01-94	North
25.	Psychology		
	Patna University	07-02-94 to 26-02-94	U.P.
		07-03-94 to 26-03-94	
	Saurashtra University	07-02-94 to 26-02-94	Gujarat
	Bharathiar University	02-11-93 to 22-11-93	Tamilnadu & Pondicherry
		05-01-94 to 25-01-94	
	Punjab University	08-12-93 to 05-01-94	North
		03-03-94 to 30-03-94	
	Nagpur University	Jan., 1994	Maharashtra
	S.N.D.T. University	30-11-93 to 23-12-93	West
		20-03-94 to 14-04-94	
	Utkal University	Dec. 1993 to Jan. 1994	East & North East
		Feb. 1994	
26.	Geography		
	Patna University	06-09-93 to 25-09-93	U.P. & Bihar
	Dr. H.S. Gaur University	29-09-93 to 19-10-93	M P.
	Aligarh Muslim University	17-11-93 to 15-12-93	U.P., West
		30-03-94 to 28-04-94	

I	II	III	IV
	North Eastern Hill University	20-09-93 to 11-10-93	North-East
		08-03-94 to 28-03-94	
	Punjabi University, Patiala	01-03-94 to 24-03-94	North/Rajasthan
27	Madurai Kamaraj University	04-02-94 to 24-02-94	Tamilnadu, Kerala & Pondicherry
	B.H.U	01-03-94 to 21-03-94	U P & Bihar
	Makhanlal Chaturvedi Institute of Journalism	27-12-93 to 15-01-94	M P., South
	Indian Institute of Mass Communication	07-03-94 to 28-03-94	
	Jamia Millia Islamia	Dec., 1993/Jan., 1994	All India
28.	Assamese	06-10-93 to 28-10-93	North
29	Hindi	Schedule awaited	
	Marathwada University	17-11-93 to 11-12-93	West (Maharashtra & Goa)
	Jai Narayan Vyas University	11-10-93 to 30-10-93	Rajasthan
	Hyderabad University	13-12-93 to 01-01-94	
		31-01-94 to 28-02-94	South (Andhra & Karnataka)
	Dr H.S. Gaur University	14-02-94 to 06-03-94	M P
	Kerala University	01-11-93 to 22-11-93	South
		25-01-94 to 15-02-94	
	Sardar Patel University	06-09-93 to 26-09-93	West (Gujarat)
	Avnashilgam Instt. of Home Science	07-02-94 to 27-02-94	
	Kashi Vidyapith	20-01-94 to 16-02-94	South (Tamilnadu, Pondicherry & Andhra)
		02-09-93 to 26-09-93	U P
		01-12-93 to 26-12-93	
30.	H P University	06-09-93 to 25-09-93	North
31.	Telugu	Schedule awaited	
31.	Malayalam		
32.	Calicut University	Feb., 1994	All India
33	Oriya	Schedule awaited	
	English		
	Marathwada University	20-09-93 to 16-10-93	West (Maharashtra)
	Kurukshetra University	15-12-93 to 04-01-94	North (Haryana)
	Calicut University	September, 1993	South (Kerala)
		January, 1994	Rajasthan
	Rajasthan University	11-01-94 to 30-01-94	All India
	CIEFL	04-10-93 to 23-10-93	
		07-03-94 to 26-03-94	
	Saurashtra University	05-12-93 to 24-12-93	West (Gujarat)
		07-03-94 to 26-03-94	
	Mysore University	27-09-93 to 23-10-93	South-West (Karnataka)
		20-12-93 to 13-01-94	
	Burdwan University	22-12-93 to 12-01-94	East (West Bengal)
	Bharthidasan University	September, 1993	Tamilnadu
	Pondicherry University	February, 1994	
	Goa University	03-02-94 to 23-02-94	South (Pondicherry & Tamilnadu)
		11-10-93 to 01-11-93	West (Goa & Maharashtra)
		07-02-94 to 28-02-94	Bihar
	Ranchi University	Sept/Oct., 1993	
	Sardar Patel University	18-10-93 to 06-11-93	West (Gujarat)
	H.P. University	04-10-93 to 23-10-93	North (Haryana & U P)
	Guru Nanak Dev University	01-12-93 to 22-12-93	North
	Lucknow University	01-02-94 to 22-02-94	
	Madras Christian College	01-11-93 to 30-11-93	U P
		November, 1993	Tamilnadu
		January, 1994	
34.	Music & Fine Arts	Schedule awaited	
35	Bengali	Schedule awaited	
36	Marathi		
	S.N.D.T. University	Feb., 1994	All India
	Nagpur University	Oct., 1993	All India
37.	Punjabi		
	Guru Nanak Dev University	01-12-93 to 22-12-93	All India
		01-02-94 to 22-02-94	
38.	Manipuri	Schedule awaited	

I	II	III	IV
39.	Urdu		
	Jamia Millia Islamia	14-12-93 to 03-01-94	North, U.P., Rajasthan, Bihar
40.	Education		
	Pachanga University	01-12-93 to 21-12-93	East
		01-02-94 to 21-02-94	
	Kurukshetra University	07-10-93 to 27-10-93	North
		10-11-93 to 30-11-93	
	Aligarh University	01-09-93 to 27-09-93	U P
	Patna University	08-11-93 to 27-11-93	Bihar
	Indian Instt. of Education, Pune	06-09-93 to 05-10-93	West
		12-10-93 to 09-11-93	
	Devi Ahilya University	20-09-93 to 16-10-93	M.P
		22-11-93 to 18-12-93	
	Sardar Patel University	29-11-93 to 19-12-93	West (Gujarat)
41.	Criminology & Forensic Science		
	National Law School of India University	04-10-93 to 24-10-93	All India
42.	Linguistics		
	CIEFL	07-02-94 to 26-02-94	All India
43.	Physical Education		
	Marathwada University	18-10-93 to 12-11-93	West
		07-02-94 to 05-03-94	
	Calicut University	January, 1994	South/East
44.	Defence Studies		
	Aligarh University	11-09-93 to 08-10-93	Need Based
		20-11-93 to 17-12-93	
45.	Arabic Persian & Islamic Studies		
	Calicut University	October, 1993	South/East
	J.M.I. (Persian)	15-02-94 to 07-03-94	North-Central-West
	J.M.I. (Arabic)	10-03-94 to 31-03-94	do-
46.	Public Administration		
	Andhra University	03-01-94 to 29-01-94	South (Andhra, North-East, Bihar, East)
			South (Tamilnadu, Kerala & Karnataka)
	Madras University	23-02-94 to 22-03-94	
47.	Adult Education		
	Sri Venkateswara Univ	13-12-93 to 01-01-94	Tamil Nadu, Kerala, Karnataka
48	Law		
	Patna University	10-01-94 to 29-01-94	East, North-East
	Delhi University	06-10-93 to 27-10-93	North
		03-01-94 to 23-01-94	
	National Law School of India University	04-02-94 to 24-02-94	South (Karnataka & Tamilnadu)
	Nagpur University	December, 1993	West (Maharashtra & Gujarat)
49.	Gujarati		
	Saurashtra University	10-01-94 to 29-01-94	All India
50.	Sanskrit		
	Gauhati University	December, 1993	Need Based
	Sri Lal Bahadur Shastri	20-10-93 to 10-11-93	North
	Rastriya Sanskrit Vidyapith	07-02-94 to 25-02-94	
	Rastriya Sanskrit Vidyapitham, Tirupati	15-11-93 to 04-12-93	South
	Nagpur University	27-12-93 to 15-01-94	
		October, 1993	Maharashtra,
		December, 1993	M P
51.	German		
	CIEFL	06-09-93 to 25-09-93	All India
		10-01-94 to 29-01-94	
52.	French		
	CIEFL	06-09-93 to 25-09-93	All India
		10-01-94 to 29-01-94	
	Pondicherry University	03-11-93 to 23-11-93	South
53.	Russian		
	CIEFL	06-09-93 to 25-09-93	All India
		10-01-94 to 29-01-94	

Selection of teachers for participation in these courses will be done by the concerned University/Institution. For further details, please contact the Director, Academic Staff College or the Head of the Department in the concerned discipline at the respective University/Institution.

BOOK REVIEW

Stimulating Reading

J.S. Rajput*

S.Z. Qasim, Ed. Science and Quality of Life. New Delhi, The Off-setters, 1993. Pp. xi + 620. Rs. 600/-.

So much has changed with the ever increasing influence of science and technology. The impact has been felt in the remotest corners; amongst the illiterates and also the weaker and deprived sections. The benefits, unfortunately, have not been distributed uniformly and equally. Those who are on the "right side" of the economic cut-off line have acquired much more as compared to those who need "much more". The quality of life has changed. How far this change has been 'desirable' is a matter of intense debate. However, there is no uncertainty about one particular aspect – that science and technology have the requisite capacity to upgrade the quality of life of every individual. Developing nations need technology that would meet their specific needs. These needs, as we all know are too diverse and too many. The scenario of scientific and technological advances is changing at a very swift pace. Its possible applications and impact often do not come within the realm of predictability. These have to be visualised. Those working in one specific area can no longer remain aloof to the happenings around them in other areas of human activities.

**Joint Educational Adviser,
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Govt. of India, New Delhi-110 001.*

The Indian Science Congress selected the focal theme as "Science and Quality of Life" for its 1993 session in Goa. Its General President, Dr S.Z. Qasim decided to edit a volume addressing the various issues that were relevant to the developing countries, particularly India. The initiative of Dr. Qasim is timely and comprehensive. Fifty eminent scientists and educationists, planners, administrators and thinkers have attempted to explore the 'potentialities for the future'. In doing so they have also identified the problems and have offered possible solutions. 'Science and Quality of Life' edited by Dr. S.Z. Qasim consists of varied yet vital intellectual ingredients that would really be a treasure worth being perused by so many.

Some of the contributors have attempted to discuss the basic question : what is meant by the quality of life? The editor has summarised this in the preface.

"... it is not enough to address the issues of human life merely in terms of quantitative numbers of economic growth or the per capita consumption. An overall improvement in the quality of life of the community in real terms is associated with the process of enlarging the range of the choice of the

community in terms of education, health care, income, employment, etc."

Education being such a critical component in the quality of life, one would like to discuss the present volume in the context of the educational scenario; science in the curriculum and the relationship of universalisation of science education to the upgradation of the quality of life. The 1968 policy on education, for the first time made science and mathematics compulsory components of school curriculum for the first ten years in schools. The distinction in terms of options to girls not to study these subjects was discarded. Two factors were acknowledged : basic understanding of science is essential for every citizen of the country and that the distinction between boys and girls and their capabilities, understanding, appreciation and utilisation of science is meaningless. Subsequent to this policy several other relevant developments took place. These included environmental orientation to school curriculum, linking curriculum to community needs and adopting a participatory and activity based approach in teaching and learning of science. This was an attempt to prepare a very strong base on two fronts; for higher education and for those who may enter life after school education itself. The significance of this particular aspect is obviously linked to the universalisation of elementary education which unfortunately is still a distant dream in India. Some of the contributors have linked this aspect to developments in science, the impact of science and the social responses it has generated. The contributions have

been classified in six sections. However, no such sharp classification is feasible in such cases.

The first eleven contributions are classified under the 'Planning and Development Paradigm'. Conceptual clarity as to what are the relevant indices for ensuring enhancement of the quality of life have been discussed. The linkage of this aspect to health, advanced technology materials, environment and energy also find a place. Gowardker, while pleading for a total systems approach, makes particular references to population and communication. He discusses these in the context of inter-disciplinarity of the issues involved. Population enhances the social and economic gaps resulting in the reduction of quality of life. Communications have the potentialities of reducing inequalities, at least partially. Two of the crucial issues currently being faced by the developing countries; other than elementary education; are health and environment degradation. These have been critically analysed by Bajaj and K. Rajan. The role of scientists in these developments has been appraised and elaborated. "Scientists' job is not just to spark off industrial or agricultural revolutions; it must also stimulate their agricultural revolutions; it must also stimulate their own integration with a whole range of societal elements. Then only we will see in perspective the issue concerning improvement of quality of life of our people through our own brand of science and technology."

This could be taken as a guiding principle by the planners of scientific and technical activities and their utilisation for peoples' welfare.

Science in the context of eco-

nomie issues has been discussed in the second section. There are pointed inferences on transport, energy conservation, financial systems and financial credits for women. These five papers logically lead to linkages with the societal issues which are of immense value to weaker sections of the society. The social issues have also been focused in the next section which very rightly discusses science in the context of Indian women, mental health, human development, population, holocaust and the quality of life of scheduled tribes in the country. The sensitivity involved in extending the benefits of scientific development to specific communities and people has to be handled with utmost care and caution. Only then such developments would lead to human welfare. The fourth section focuses on the welfare in terms of the potentialities that exist before the nation. Ocean has been discussed in the context of nutrition, minerals, polymetallic nodule resources, telecommunication and energy. In the specific context of human welfare, Nitish Sengupta discusses the indices of quality of life. He makes particular reference to communication, medicine, biotechnology, genetic engineering, agriculture, multi-purpose dams and information technology. He tries to identify the immediate tasks before scientists :

"The mission before scientists of the future would be to work out new resources of energy, new medicines for new diseases, to control pollution, to develop industrial innovations which are environment friendly, to harness nuclear and solar energy without harmful effects and lastly to search for new sources of food from the aquatic environment, hitherto unexplored."

Many of the scientists are also teachers. They participate not only in improving the understanding of scientific and technological processes but are a part of the efforts to upgrade the quality of education. In our context access to basic education is the first priority. The expansion and access to basic education are pre-requisites for upgradation of the quality of life. The next section of four contributions relates science and education to human development. The contribution by Dr. Chitra Naik summarises in totality the basic education scenario in India, particularly the developments that have taken place after independence. The experiences gained have been critically analysed and related to the potentialities for future action. She points out the factors responsible for delay in our efforts to universalise elementary education. From this emerges the need to evolve area specific strategies that could meet the learning needs of children and people of particular region, community and social background. This sector deserves utmost priority for weaker sections and women. It has been suggested that unless and until there is total involvement of community and education becomes a mass movement the desired goals would remain elusive. The encouraging aspect of our experience has been the age old tradition of community participation in education. Even in the recent past, wherever this has been attempted, it has presented an encouraging example of mass movement in education. The linkages of mass education to economic productivity are presented in a very lucid manner by Dr. Naik :

"Comparative studies across developing countries have shown that four years of primary education has served to

increase the productivity of farmers by 8.7%. The benefits of primary education became evident among the farmers who adopted modern practices, an understanding of improved technologies, and skills in increasing the marketability of products. Studies on earnings in developing countries have shown that returns to primary education average around 27% and to secondary education around 15-17%. The value of primary/elementary education for overall economic growth has been proved to be greater than that of secondary and higher education".

However, she goes on to point out that universal primary education alone cannot be a solution to all the problems. Linkages of these efforts will have to be established with land reforms, decentralisation of administrative and financial powers, the culture of equity and political will to improve the lot of those who need it most.

On a firm foundation of universal elementary education the role of higher education could be crucial. These aspects have been elaborated and examined by Swaminadhan and Ashok Chandra. Nigam has identified the role of industrial and technological research institutions. It very clearly delineates the role that specialised institutions could play in relating science and technology to the life of individuals. At this stage one may like to refer to the role of scientists and teachers in a comprehensive manner. The teacher's influence on his pupils is everlasting. It does not limit itself to the specific area of learning but pervades to all aspects of his adult

life. A teacher is not supposed only to teach, he is responsible for shaping the understanding, attitudes and aptitudes of each and every individual under his charge. Teachers, whether at elementary stage or in institutions of higher learning and research, are equally responsible to look beyond the textbooks and curriculum prescribed for examinations. The need for inculcation of values and norms could hardly be over emphasized at this juncture of social upheavals. One often talks of our scientists migrating to foreign countries in search of greener pastures. Most of them who remain in India or return to India after few years abroad persistently complain of inadequate facilities and infrastructure. This results in generating an atmosphere of gloom and despair in the institutions. Probably they have to develop an attitude of perceiving their role in the totality of the situation. It would be necessary for senior scientists and the educationists to ensure that the younger generation does not see only the darker side of the situation. Prof. C.N.R. Rao in his Presidential Address at the Platinum Jubilee session of Indian Science Congress held at University of Poona had elaborated this aspect very eloquently :

"When some of us talk discouragingly about science (and scientists) and we ourselves are most of the time depressed, I do not think that young people will get enthused to take up scientific profession. It is much better for them and more lucrative to sell soap than take the hard path of science. In addition to providing the right atmosphere, senior scientists have also to set an example in not compromis-

ing to mediocrity in everything they do".

The last section consisting of thirteen articles attempts to identify the frontier areas. The intention is to put before the reader the potentialities of the science and technological implications in some of the areas of immediate concern to humanity. Bio-technology, meteorology, information technology, new materials and perceptive for quality and efficiency are some which attract immediate attention. While the scientists have already explored these areas to a considerable extent and put their findings to the use and benefit of human beings, they have also simultaneously identified the need for greater exploration investigation and research. An amazing array of possibilities and potentialities unfolds itself before the reader once he goes through these articles.

Dr. Qasim has achieved his objective by putting fifty contributions in one volume "addressing the various facets of the complex subject". No significant area has been left uncovered or undiscussed in this volume. It is well printed and well designed. For those interested in science and the scientists working in institutions of higher learning and research, this volume should provide a very stimulating reading. It should certainly find a place in libraries of schools, colleges and universities. As a matter of fact this volume should lead to a continuous series of sessions and discussions on the relationship of science to quality of life. Such interaction should generate awareness, create inter-active opportunities and expose the challenges before the scientifically oriented individuals and scientists. And in such discussions, if individuals of the stat-

ure of Qasim could participate, they would be generating unimaginable response for individual and collective action.

In this context the reviewer may be allowed to digress and recall an instance where Dr. Qasim was the main actor. After leading his first successful expedition to Antarctica, Qasim became a household name. He visited Bhopal and addressed a select gathering in an educational institution. The students of that institution approached the Principal and were pretty agitated about this visit! How could S.Z. Qasim come to the institution and leave without addressing them? They had a right to meet him. The Principal of the college liked this agitational approach and the sentiments of the students with the achievement of an individual who had enthused and motivated the young throughout the country. He approached Dr. Qasim who had an 'extremely tight schedule'. The Principal (yours truly) insisted on getting "few minutes". Very gracefully, Dr. Qasim agreed to spare ten minutes so that the students "could see him". This interaction lasted for about 90 minutes, in a participatory and conversational style. An audience of about 700 young persons was overwhelmed by his presentation, there was so much of motivation, enthusiasm and respectful affection. This particular instance represents the relationship of the achievements in science and the impact it creates on individuals, group of individuals and the community. The multiplier effect of such institutional interactions would be tremendous. If Dr. Qasim could interact with young persons more frequently, in spite of heavy demands on him by the responsibilities assigned to him officially! Maybe through this volume, he is attempting the same.



Indira Gandhi National Open University

Schedule of Telecast for the period 1 September to 30 September, 1993
6.25 a.m. to 6.55 a.m.

Date/Day	Academic Programme	Title
1.9.93 Wednesday	General	University with a Difference
3.9.93 Friday	Management	Management Information Systems
6.9.93 Monday	Bachelor's Degree Programme	Curves
8.9.93 Wednesday	Rural Development	Gramin Sehkari
10.9.93 Friday	Management	Marketing of Services — Destination India
13.9.93 Monday	Bachelor's Degree Programme	Wakron ki Jyanti
15.9.93 Wednesday	Creative Writing	1. Writing for Children 2. Open Channel
17.9.93 Friday	Management	Institutional Infrastructure for Export Promotion
20.9.93 Monday	Child Care Services	Narrating Stories
22.9.93 Wednesday	Computers in Office Mgt.	Phased Modernisation of an Office - I
24.9.93 Friday	Management	Computer Software
27.9.93 Monday	Child Care Services	Kahani Kaise Sunayen Pt. I
29.9.93 Wednesday	Library and Info. Sc.	Classification Catalogue Code Pt. I

THESES OF THE MONTH

A list of doctoral theses accepted by Indian Universities

BIOLOGICAL SCIENCES

Biochemistry

1. Ansari, Md Mansoor Alam. Hormonal regulation of key aspects of carbohydrate metabolism in rat choroid plexus. JNU Prof Najma Zahoor Baquer, School of Life Sciences, Jawaharlal Nehru University, Delhi.
2. Ardhendu Kumar Qaar studies of some pharmacologically active compounds with special reference to benzodiazepines and nitromidazoles. Calcutta
3. Bandhyopadhyay, Rupa. Studies on the DNA mismatch repair system of *Vibrio cholerae* : Status of the DNA adenine methylase gene Calcutta.
4. Chhabra, Saranjit Kaur Modulation of carcinogen metabolizing enzymes in liver of lactating mice and their neonates by certain chemical agents. JNU Prof A R Rao, School of Life Sciences, Jawaharlal Nehru University, Delhi.
5. Deora, Alok Evaluation of the effect of synthetic gonadotropin releasing hormone analog(s) on the breeding of freshwater fishes JNU Dr Lalit C Garg and Prof G P Talwar
6. Gupta, Sanjay. Physiological role(s) of hyaluronectin, a cell surface-associated protein. JNU Dr (Mrs) K Datta, Assoc Prof, School of Environmental Sciences, Jawaharlal Nehru University, Delhi
7. Mohamed Said Ahmed Mode of action of DNA reactive mutagens - Mode of action of dietary flavonoids AMU Prof SM Hadi, Department of Biochemistry, Aligarh Muslim University, Aligarh
8. Nagendra, S N Disulfiram conversion to diethyldithio carbamate and its metabolic implications. Bangalore Dr K Taranath Shetty, Additional Prof and Dr M N Subhash, Assoc Prof, Department of Neurochemistry, National Institute of Mental Health and Neuro Sciences, Bangalore.
9. Singh, Amrendra Pratap Role of calcium in radiation induced cell damage JNU Dr R K Kale, Assoc Prof, School of Life Sciences, Jawaharlal Nehru University, Delhi.
10. Sitasawad, Sandhya L. Investigation into radiation induced lipid peroxidation JNU Dr R K Kale, Assoc Prof, School of Life Sciences, Jawaharlal Nehru University, Delhi.
11. Taneja, Shashi. Mechanism of salt tolerance in *Brassica juncea* somaclones. HAU

Microbiology

1. Brijvir Singh Studies on the biology of alkalophilic cyanobacteria Jamia. Dr Tasneem Fatima, Lecturer, Department of Biosciences, Jamia Millia Islamia, Delhi.
2. Chandrasekhar, S. Development of a recombinant rabies vaccine using vaccinia as vector JNU Prof G P Talwar and Dr P S Khandekar.
3. Pohnerkar, Jayashree. Genetics of osmoregulation in *Escherichia coli* K-12 : Isolation and characterization of mutants altered in regulation of the ProU operon. JNU Prof J Gowrishanker
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4. Duriya, Shivshankar Investigation into the vegetative propagation of some multipurpose tree species and their field performance HS Gour Prof G P Mishra, Department of Botany, Dr H S Gour Vishwavidyalaya, Sagar.
5. Hariprasad, P Chemical mutagenesis in anther haploids of *Nicotiana tabacum* L. Gulbarga
6. Hemalatha, A B Chemotaxonomical studies in some Euphorbiaceae Osmania
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OR

Sangeet Visharad from Gandharv Mahavidyalaya Mandal, Poona

Only candidates who possess the qualifications will be called for interview. The prescribed application form can be had from the Manager, Printing & Publications, Kurukshetra University, Kurukshetra on payment of Rs. 10/- on the counter or by making written request accompanied by self-addressed envelope (23 x 10) duly stamped for Rs. 8/- for each post alongwith the bank draft of Rs. 10/- drawn in favour of the Registrar, Kurukshetra University, Kurukshetra and payable at the state Bank of India, University Campus, Kurukshetra.

Applications on prescribed form (alongwith its six xeroxed copies) complete in all respect (through proper channel for those in employment) should reach the office of the Asstt. Registrar (Estt.) of this University by 15-9-1993 alongwith Bank Draft of Rs 15/- as application fee, drawn in favour of the Registrar, Kurukshetra University, Kurukshetra or the amount can be deposited with the Cashier of this University and the original receipt be enclosed with application. S.C./S.T./B.C. and Ex-servicemen are exempted from the application fee. The applications not in the prescribed proforma or incomplete application not supported with required application fee, attested copies of the certificates or application received after the last date will be rejected.

REGISTRAR



भारतीय प्रौद्योगिकी संस्थान, दिल्ली
INDIAN INSTITUTE OF TECHNOLOGY : DELHI
HAUZ KHAS : NEW DELHI - 16

ADVERTISEMENT NO. E-II 05 93(E)

Applications in the prescribed form are invited for the following posts .

DEPARTMENT OF APPLIED MECHANICS

- 1 **TECHNICAL ASSISTANT** - 1 post
Scale Rs 1400-40-1600-50-2300-EB-60-2600
(Res. for ST)

Minimum Qualifications/Experience AMIE/Degree in Engg /M Sc OR B Sc /B A (Maths) with 3 years of laboratory experience in specific scientific field OR Diploma in related technical discipline with 2 years experience in the desired field OR Inter Sc. with 5 years experience in related laboratory or workshop OR Matric with ITI certificate with 5 years experience in related trade

Desirable He should be able to maintain/repair electronic instruments as well as data acquisition systems which are used in laboratories.

BIO-CHEMICAL ENGINEERING RESEARCH CENTRE

- 2 **PLANT OPERATOR** - 1 post
Scale Rs. 1400-40-1800-EB-50-2300
(Temp for a period not exceeding duration of the project)

Minimum Qualifications/Experience Degree in Chemical Engineering/Biochemical Engineering OR M Sc in Chemistry/Biotechnology/Microbiology/Biochemistry OR Diploma in Chemical/Mechanical Engineering with six years relevant experience OR B Sc. Chemistry with six years experience

DEPARTMENT OF CHEMISTRY

- 3 **SR. TECHNICAL ASSISTANT** - 1 post
Scale Rs 2000-60-2300-EB-75-3200 (Res for SC)

Minimum Qualifications/Experience AMIE/Degree in Engg /M Sc OR Diploma/B Sc with 5 years relevant experience OR Matric with ITI Certificate/Inter Sc. with 12 years relevant experience

Desirable Ability to operate and maintain common instruments like visible and infrared spectro-photometers, polarograph, ion meter etc. which are used in postgraduate (M Sc, M Tech. level) laboratories, and to supervise the work of subordinate staff

CENTRE FOR BIO-MEDICAL ENGINEERING

- 4 **MEDICAL LABORATORY TECHNICIAN** - 1 post
Scale Rs 1320-30-1560-EB-40-2040 (Res for ST)

Minimum Qualifications/Experience B Sc. (Medical Laboratory Technology) OR Higher Secondary (Science) with Diploma in M L T from a Government recognised Institution with atleast two years experience in a recognised biomedical laboratory(s). Knowledge of blood biochemical assessment essential.

Desirable : Experience in Histology and handling animals for experimental research

5. **DATA PROCESSOR** - 1 Post
(Under Thrust Area Project)
Scale: Rs. 1400-40-1600-50-2300-EB-60-2600
(Temporary, Project Post)

Minimum Qualifications/Experience. AMIE/Degree in Engg /Grad IETE/M.Sc. OR Diploma in Engg./B.Sc./B.A./B.Com. with 3 years experience in the field of Computers OR Matriculate with ITI Certificate/Inter Science and 5 years relevant experience.

Desirable Preference will be given to those candidates who have experience in computer operation, knowledge of D base, Lotus HG, SPSS etc. Good speed in Data Entry is essential.

CENTRAL WORKSHOP

6. **MECHANIC** - 1 Post
Scale Rs 975-25-1150-EB-30-1540 (Res. for SC)

Minimum Qualifications/Experience Matric with ITI Certificate with one year experience in a recognised workshop OR Good school education upto atleast 8th standard with 5 years of industrial experience including apprenticeship in a recognised workshop in the trade of machinist/Turner/Fitter

GUEST HOUSE

- 7 **ASSTT. CARETAKER** -1 Post
Scale Rs 850-20-1150-EB-25-1500 (Temp for a period not exceeding 12 months)

Minimum Qualifications/Experience Must have passed Matriculation or equivalent with experience preferably in managerial capacity in a big hostel or catering establishment and be conversant with work relating to catering to parties, accounts, stores and reservations. Knowledge of typewriting will be an additional qualification

INSTRUMENT DESIGN AND DEVELOPMENT CENTRE

8. **SENIOR MECHANIC (Welding)** - 1 Post
Scale Rs 1320-30-1560-EB-40-2040

Minimum Qualifications/Experience Matric with ITI Certificate with 7 years experience in a recognised workshop OR Good school education upto atleast 8th standard with 15 years of industrial experience including apprenticeship in a recognised workshop in the trade of welding.

9. **MECHANIC (Sheetmetal)** 1 Post
Scale Rs. 975-25-1150-EB-30-1540

Minimum Qualifications/Experience. Matric with ITI Certificate and one year experience in a recognised workshop OR Good school education upto atleast 8th standard with 5 years of industrial experience including apprenticeship in a recognised workshop

PLANNING UNIT

10. ASSISTANT RESIDENT ENGINEER (Telephones) - 1 post
Scale: Rs. 2000-60-2300-EB-75-3200-100-3500

Minimum Qualifications/Experience: Degree in Electrical/Communication Engineering with 3 years experience in Operation/Maintenance of Telephone Exchanges OR Diploma in Electrical Engineering with 8 years experience in Operation/Maintenance of Telephone Exchanges OR M.Sc. (Electrical) with 5 years experience in Operation/Maintenance of Telephone Exchanges.

SPORTS UNIT

11. SWIMMING COACH-CUM-LIFE GUARD - 1 Post
Scale: Rs. 1400-40-1600-50-2300-EB-60-2600

Minimum Qualifications/Experience: Graduate from a recognised University Qualified Coach from the National Institute of Sports. Inter university/National participation in Swimming and/or Water polo

Desirable: Preference will be given to holders of Degree/Diploma in Physical Education and having experience as Coach-cum-Life Guard.

WORKS ORGANISATION

12. ASSISTANT RESIDENT ENGINEER (ELECT.) -2 posts
Scale: Rs. 2000-60-2300-EB-75-3200-100-3500
(1 Res. for ST)

Minimum Qualifications/Experience: Degree in Electrical Engineering with 3 years experience OR Diploma in Electrical Engineering with 8 to 10 years experience of which atleast 5 years should relate to PWD, MES, Railways and Electricity Board.

The incumbents will be considered for confirmation only after qualifying the departmental examination in accounts etc prescribed by CPWD for the corresponding cadre

13. FOREMAN (ELECT.) - 1 Post
Scale: Rs. 2000-60-2300-EB-75-3200 (Res for ST)

Minimum Qualifications/Experience: Diploma in Elect. Engg./Technology plus 7 years of workshop experience OR Matric with ITI Certificate and regular experience in an established and reputed industrial organisation or institutional workshop of repute for 12 years.

Candidates should have good experience of installation preventive and breakdown maintenance of electrical installation of Institution/University buildings, laboratories and managing large number of technicians at workshop level.

14. JUNIOR ENGINEER (CIVIL) - 1 Post
Scale: Rs. 1400-40-1600-50-2300-EB-60-2600

Minimum Qualifications/Experience: Diploma or Overseer's Certificate in Civil Engg. with 2 years experience in building works. Experience in sanitary and water supply works and roads and capacity to handle labour

Desirable: Condition of experience will not be necessary in case of candidates with Degree in Civil Engg.

15. JUNIOR ENGINEER (ELECTRICAL) - 2 Posts
Scale: Rs. 1400-40-1600-50-2300-EB-60-2600
(1 Res. for ST)

Minimum Qualifications/Experience: Diploma or

Overseer's Certificate, in Elect Engg with 2 years experience in Electrical/Installation/Maintenance Capacity to handle labour is desirable Experience of maintenance of HT/LT sub-stations overhead/underground distribution switch gears, power control centres, electrification in multistorey buildings will be preferred.

Desirable: Candidates having experience of operation/maintenance of all type of air conditioning installations will be preferred

ADMINISTRATION

16. U.D.C. (CASH) - 1 post
Scale: Rs.1200-30-1560-EB-40-2040 (Res for SC)

Minimum Qualifications/Experience: Graduate with considerable experience in Govt. Offices or in Educational Institution or in a business firm of repute. Should have experience in handling cash and Govt. papers, maintaining cash book and transactions with bank.

17. SENIOR STENOGRAPHER - 2 Posts
Scale: Rs. 1400-40-1600-50-2300-EB-60-2600 (1 Res. for SC, 1 temporary for a period not exceeding 12 months)

Minimum Qualifications/Experience: Should have passed atleast Matriculation or equivalent. Speed in Shorthand and Typewriting at 120 w.p.m. and 40 w.p.m. respectively Sufficient previous experience in the line.

Desirable: Graduate Knowledge of Hindi Stenography/Word Processing/Personal Computers.

18. STENOGRAPHER - 6 Posts
Scale: Rs. 1200-30-1560-EB-40-2040 (3 Res for SC, 1 for a period not exceeding 12 months, 2 Res. for ST)

Minimum Qualifications/Experience: Should have passed Matric or equivalent. Speed in Shorthand 100 w.p.m. and in Typewriting 40 w.p.m.

Desirable: Some experience Graduate having knowledge of Hindi Stenography/Word Processing/Personal Computers.

CENTRAL LIBRARY

19. PROFESSIONAL ASSTT. - 3 Posts
Scale: Rs. 1400-40-1600-EB-50-2300 (1 Res for ST)

Minimum Qualifications/Experience: Degree with Diploma or Certificate in Library Science.

Desirable: Knowledge of Computers and experience in working on Personal Computers with Wordstar, Dbase etc.

Note: Age should not be more than 35 years (relaxable as per Govt. Rules for SC/ST and Ex-serviceman candidates) May be relaxed in highly experienced and deserving cases.

Both SC & ST candidates are eligible to apply for the reserved posts. However, in the event of non-availability of suitable ST candidates, the posts reserved for them may be filled up with SC candidates and vice-versa.

Prescribed application form and "Instructions to the candidates" can be obtained from the Superintendent (Estt-II), INDIAN INSTITUTE OF TECHNOLOGY, Hauz Khas, New Delhi-110 016 by Sending a self addressed stamped (Rs 2/-) envelope of 28 x 12 cms. and outer cover of request should be superscribed "Request for application form" by 13th Sept. 1993.

The last date for receipt of completed application form is 24th Sept. 1993.

AGRICULTURAL SCIENTISTS RECRUITMENT BOARD (I.C.A.R.)

Krishi Anushandhan Bhavan, Pusa, New Delhi-110 012.

Advertisement No. 4/93

Applications are invited for the following Scientific/Technical posts under the different Institutes and at the Headquarters of the ICAR, New Delhi.

1. ASSISTANT DIRECTOR GENERAL (Vegetable), Indian Council of Agricultural Research Headquarters, New Delhi (one Post)

Pay Scale : Rs 4500-7300 **Age :** Below 50 years

Qualifications Essential : (i) An eminent scientist with published work of high quality, actively engaged in research/teaching/extension education (ii) Good academic record with doctoral degree in Horticulture/Olericulture (iii) 15 years experience (excluding the period spent in obtaining Ph D degree subject to a maximum of three years) of research/teaching/extension education, out of which at least five years should be as a Principal Scientist or in an equivalent grade (iv) Evidence of substantial contribution to research and scholarship as evidenced by variety product or technology developed or adopted as a result of research, the quality of publication of papers in professional journals of repute, approved recommendations emanating from research or innovations in teaching/educational technology (v) Specialised knowledge and working research experience in the field of Vegetables/Floriculture/Tuber Crops including Potato

2. ASSISTANT DIRECTOR GENERAL (Horticulture), Indian Council of Agricultural Research Headquarters, New Delhi (One Post)

Pay Scale : Rs 4500-7300 **Age :** Below 50 years

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in Horticulture/ Plant Breeding or Plant Physiology (iii) As in Item No 1 (iii) above (iv) As in Item No 1(iv) above (v) Specialisation and experience on fruit crops

3. DIRECTOR, Central Soil and Water Conservation Research and Training Institute, Dehradun (One Post)

Pay Scale : Rs 4500-7300 **Age :** Below 50 years

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in any branch of Agricultural or related disciplines basic to Soil and Water Conservation (iii) As in Item No 1(iii) above (iv) As in Item No 1(iv) above (v) Specialisation and established reputation in research in the area of Soil Water Conservation and Watershed Management.

4. PROJECT DIRECTOR, Project Directorate on Water Management, M.P.K.V., Rahuri, Distt. Ahmednagar (M.S.) (One Post)

Pay Scale : Rs 4500-7300 **Age :** Below 50 years

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in the field of Soils/Agronomy/Agricultural Engineering or any other related disciplines (iii) As in Item No 1 (iii) above (iv) As in Item No 1(iv) above (v) Specialisation in the field of Agricultural Water Management.

5. PROJECT DIRECTOR, Project Directorate for Cropping Systems Research, Modipuram (One Post)

Pay Scale : Rs 4500-7300 **Age :** Below 50 years

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in the Agricultural Sciences (iii) As in Item No 1 (iii) above (iv) As in Item No 1(iv) above (v) Specialisation in area of cropping/farming systems research

PROJECT COORDINATORS

Pay Scale: Rs 4500-7300 **Age** Below 50 years

6. PROJECT COORDINATOR (Fruits), Central Institute of Horticulture for Northern Plains, Lucknow (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in Horticulture/Plant Breeding or Plant Physiology (iii) 13 years experience (excluding the period spent in obtaining Ph D degree subject to maximum of three years) of research/teaching/extension education, out of which at least three years should be as a Principal Scientist or in an equivalent grade (iv) As in Item No 1(iv) above (v) The candidate should have acquired sufficient research experience and specialisation in resolving production problems of sub-tropical fruits

7. PROJECT COORDINATOR (Research), Central Research Institute for Dryland Agriculture, Hyderabad (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in any field of Agricultural or related Sciences (iii) As in Item No 6(iii) above (iv) As in Item No 1(iv) above (v) Should have specialised knowledge and have experience or research in the field of rainfed farming

8. PROJECT COORDINATOR (Sheep Breeding), Central Sheep and Wool Research Institute, Avikanagar (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in the subject in Animal Genetics and Breeding (iii) As in Item No 6(iii) above (iv) As in Item No 1(iv) above (v) Specialisation and experience in Sheep Breeding, management of large flocks, data processing and computerisation, Statistical analysis of on farm and off farm data

HEADS OF DIVISIONS AND REGIONAL STATIONS

Pay Scale : Rs 4500-7300 **Age :** Below 50 years

CENTRAL RESEARCH INSTITUTE FOR DRYLAND AGRICULTURE, HYDERABAD.

9. HEAD, DIVISION OF RESOURCE MANAGEMENT (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in Soil Science/Soil Conservation Engineering/Agrometeorology or in related discipline (iii) As in Item No 6(iii) above (iv) As in Item No 1(iv) above (v) Specialisation and experience of research in Soil Science/Soil Conservation Engineering/Agrometeorology or in related discipline

10. HEAD, DIVISION OF CROP SCIENCES (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in Agronomy/Crop Physiology/Plant Breeding/Agro-forestry or in a related discipline (iii) As in Item No 6(iii) above (iv) As in Item No 1(iv) above (v) Specialisation and experience of research in Agronomy/Crop Physiology/Plant Breeding/Agro-forestry or in a related discipline

JUTE TECHNOLOGICAL RESEARCH LABORATORIES, CALCUTTA.

11. HEAD, DIVISION OF CHEMICAL TECHNOLOGY (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good academic record with a doctoral degree in Chemistry/Chemical Technology/Chemical Engineering (iii) As in Item No 6(iii) above (iv) As in Item No 1(iv) above (v) Relative specialisation and relevant experience cognate to the job requirement.

12. HEAD, DIVISION OF TEXTILE AND NON-WOVEN TECHNOLOGY (One Post)

Qualifications Essential : (i) As in Item No 1(i) above (ii) Good

academic record with a doctoral degree in textile Technology (III) As in Item No. 6(III). (IV) As in Item No 1(IV) above (V) As in Item No 11(V) above

13. HEAD, DIVISION OF CHEMISTRY & MICROBIOLOGY (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Chemistry/Microbiology/Bio-chemistry (III) As in Item No 6(III) (IV) As in Item No 1(IV) above (V) As in Item No 11(V) above.

14. HEAD, DIVISION OF PHYSICS & PHYSICAL TESTING (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Physics/Textile Physics/Fibre Science (III) As in Item No 6(III) (IV) As in Item No 1(IV) above (V) As in Item No 11(V) above

CENTRAL POTATO RESEARCH INSTITUTE, SHIMLA.

15. HEAD, DIVISION OF CROP PHYSIOLOGY & BIOCHEMISTRY (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Crop Physiology or Biochemistry. (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Specialisation in Crop Physiology and Biochemistry of Potato/Tuber Crops or Vegetable crops

16. HEAD, DIVISION OF SOCIAL SCIENCE (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Agricultural Economics/ Agricultural Extension/Agricultural Statistics (III) As in Item No 6(III) (IV) As in Item No 1(IV) above (V) Specialisation in Agricultural Extension/Agri. Economics/Agricultural Statistics

17. HEAD, DIVISION OF SEED PRODUCTION (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Plant Pathology/ Agronomy/Plant Breeding/Entomology/Seed Technology (III) As in Item No 6(III) (IV) As in Item No 1(IV) above (V) Specialisation in Plant Pathology/Agronomy/Plant Breeding/ Entomology/ Seed Technology preferably of potato/tuber crops or vegetable crops

18. HEAD, DIVISION OF PLANT PATHOLOGY (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Plant Pathology (III) As in Item No 6(III) (IV) As in Item No 1(IV) above (II) Good academic record with a doctoral degree in genetics or plant breeding (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Specialisation in plant Pathology preferably in Potato, Tuber Crops or Vegetable Crops

19. HEAD, DIVISION OF GENETICS & PLANT BREEDING (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Genetics or Plant Breeding (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Specialisation in genetics or plant breeding preferably in Potato/ Tuber Crops or Vegetable Crops

20. HEAD, DIVISION OF NEMATOLOGY & ENTOMOLOGY (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Entomology or Nematology (III) As in Item No 6(III) above. (IV) As in Item No 1(IV) above (V) Specialisation in Nematology and Entomology preferably of Potato/Tuber or Vegetable Crops

21. HEAD, DIVISION OF AGRONOMY & SOIL SCIENCE (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Agronomy, Soil Science or Agricultural Engineering (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Specialisation in Agronomy, Social Science or Agri. Engineering preferably in Potato/Tuber Crops or Vegetable Crops

22. HEAD, DIVISION OF POST-HARVEST TECHNOLOGY (One Post).

Qualifications Essential : (I) As in Item No 1(I) above. (II) Good

academic record with a doctoral degree in Food Science or Science in any subject having relevance to post harvest technology (Microbiology, Food Science, Biochemistry, Plant Physiology or Horticulture) (III) As in Item No 6(III) above (IV) As in Item No. 1(IV) above (V) Specialisation in post harvest Technology in Potato/Tuber Crops or Vegetable Crops

INDIAN INSTITUTE OF HORTICULTURAL RESEARCH, BANGALORE

23. HEAD, CHES, RANCHI (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Horticulture or any other branch of Agricultural Sciences or Botany (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in Horticultural Crops with particular reference to tropical and subtropical Horticultural Crops

24. HEAD, CHES, GODHRA (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (III) As in Item No 23(III) above (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in the field of Horticultural Crops as evidenced by published work

25. HEAD, DIVISION OF FRUIT CROPS (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Horticulture/Agricultural Botany/Botany (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in Tropical/Sub-tropical Fruit Crops as evidenced by published work

26. HEAD, DIVISION OF VEGETABLE CROPS (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Horticulture/Olericulture/Plant Breeding/ Cytogenetics and Genetics/ Agricultural Botany/Botany (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in Vegetable Crops Breeding/Production/Vegetable Seed Production as evidenced by published work

27. HEAD, DIVISION OF AGRICULTURAL ENTOMOLOGY & NEMATOLOGY (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Agricultural Entomology/Nematology/Plant Pathology with Specialisation in Entomology (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in Insect Pest Mites/Nematodes infecting Horticultural Crops as evidenced by published work

28. HEAD, DIVISION OF SOIL SCIENCE (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Soil Science/Agricultural Chemistry (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in Soil/Fertility/Fertiliser use/ Soil Chemistry/Soil Microbiology with particular reference to Horticultural Crops as evidenced by published work

29. HEAD, DIVISION OF PLANT PATHOLOGY (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Plant Pathology/Mycology/Botany with specialisation in Plant Pathology/ Virology/ Bacteriology/Mycology (III) As in Item No 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in diseases caused by fungi/bacteria/Viruses/mycoplasma-like Organisms in Horticultural Crops or in Mushroom Culture as evidenced by published work

30. HEAD, DIVISION OF ORNAMENTAL CROPS (One Post)

Qualifications Essential : (I) As in Item No 1(I) above (II) Good academic record with a doctoral degree in Horticulture/Plant Breeding/Cytogenetics and Genetics/Agricultural Botany/Botany (III) As in Item No. 6(III) above (IV) As in Item No 1(IV) above (V) Research experience in Ornamental Breeding/Culture as evidenced by published work.

31. HEAD, DIVISION OF POST HARVEST TECHNOLOGY (One Post).

Qualifications Essential : (I) As in Item No 1(I) above. (II) Good

academic record with a doctoral degree in Horticulture/ Post Harvest Technology/Botany/Microbiology/Plant Physiology/ Biochemistry. (III) As in item No 6(III) above. (iv) As in item No. 1(iv) above. (v) Research experience in the field of fruits and Vegetable Crops with a particular reference to Storage/Processing/ Microbiology as evidenced by published work.

32 HEAD, DIVISION OF BIO-TECHNOLOGY (One Post)

Qualifications Essential: (I) As in item No 1(I) above. (II) Good academic record with a doctoral degree in Horticulture/ Biotechnology/Microbiology/Botany/Plant Physiology/ Cytogenetics/ Agricultural Botany/ Bio-chemistry (III) As in item No. 6(III) above. (iv) As in item No. 1(iv) above (v) Research experience in biotechnology aspects of Horticultural Crops as evidenced by published work.

33. HEAD, DIVISION OF PLANT PHYSIOLOGY AND BIOCHEMISTRY (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Plant Physiology/Plant Bio-chemistry/Agricultural Chemistry/ Organic Chemistry/Botany with specialisation in Plant Physiology (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Research experience in the field of Horticultural Crops as evidenced by published work.

INDIAN INSTITUTE OF SUGARCANE RESEARCH, LUCKNOW

34 HEAD, DIVISION OF AGRONOMY (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Agronomy (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and experience of research in the field of Agronomy

35.HEAD, DIVISION OF CROP IMPROVEMENT (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Plant Breeding/Genetics and Cytogenetics/Bio-technology/ Botany or Agricultural Botany with specialisation in Plant Breeding and Genetics (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and experience of research in the field of Crop Improvement.

36. HEAD, DIVISION OF PLANT PHYSIOLOGY & BIO-CHEMISTRY (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Plant Physiology/ Biochemistry (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and research experience in Plant Physiology/Bio-chemistry

37. HEAD, DIVISION OF EXTENSION & TRAINING (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Agricultural Extension/ Training (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and experience in extension and training

38. HEAD, DIVISION OF AGRICULTURAL ENGINEERING (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Agricultural Engineering (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and experience of research in the field of Agricultural Engineering

39. HEAD, DIVISION OF PLANT PATHOLOGY (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Plant Pathology (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) specialisation and experience of research in the field of Plant Pathology

40. Head, Division of Entomology (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in Entomology (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and experience of research in the field of Agricultural Entomology

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE, COCHIN

41. HEAD, DIVISION OF CRUSTACEAN FISHERIES

(One Post).

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a Ph.D. Degree in Zoology/Fisheries Science/Marine Biology/Mariculture related to Crustacean capture or culture fisheries (III) As in item No 6(III) above. (iv) As in item No 1(iv) above (v) Relative specialisation in Crustacean taxonomy, biology, capture and culture fisheries and relevant experience in planning, guiding and implementing research programme in crustacean capture and culture fisheries

CENTRAL SHEEP & WOOL RESEARCH INSTITUTE, AVKANAGAR

42. HEAD, DIVISION OF ARID REGION CAMPUS OF CSWRI AT BIKANER (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) Good academic record with a doctoral degree in any branch of Veterinary or Animal Sciences (III) As in item No. 6(III) above (iv) As in item No 1(iv) above (v) Specialisation and experience in any discipline of Animal Sciences Specialization in modern research Methodologies of Animal Improvement programmes

43. HEAD, NORTH TEMPERATE REGIONAL STATION OF C.S.W.R.I., AT GARSA (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) As in item No 42(II) above (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) As in item No 42(v) above

44. HEAD, SOUTHERN REGIONAL RESEARCH CENTRE OF C.S.W.R.I., AT MANNAVANUR (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) As in item No 42(II) above (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) As in item No 42(v) above

45. HEAD, DIVISION OF ANIMAL NUTRITION (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) A doctoral degree in Veterinary Science/Animal Science/ Dairy Science with specialisation in Animal Nutrition (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Relative specialisation and relevant experience cognate to the job requirement in the field of Veterinary Science/Animal Science/Dairy Science with specialisation in Animal Nutrition

46. HEAD, DIVISION OF ANIMAL PHYSIOLOGY (One Post)

Qualifications Essential: (I) As in item No 1(I) above (II) A doctoral degree in Veterinary Science/Animal Science/ Dairy science with specialisation in Animal Physiology/Animal Reproduction, Animal Gynaecology (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Relative specialisation and relevant experience cognate to the job requirement in the field of Animal Physiology/Animal Reproduction/Animal Gynaecology/ Endocrinology/ Animal Biochemistry

47. HEAD, DIVISION OF ANIMAL GENETICS & BREEDING (One Post)

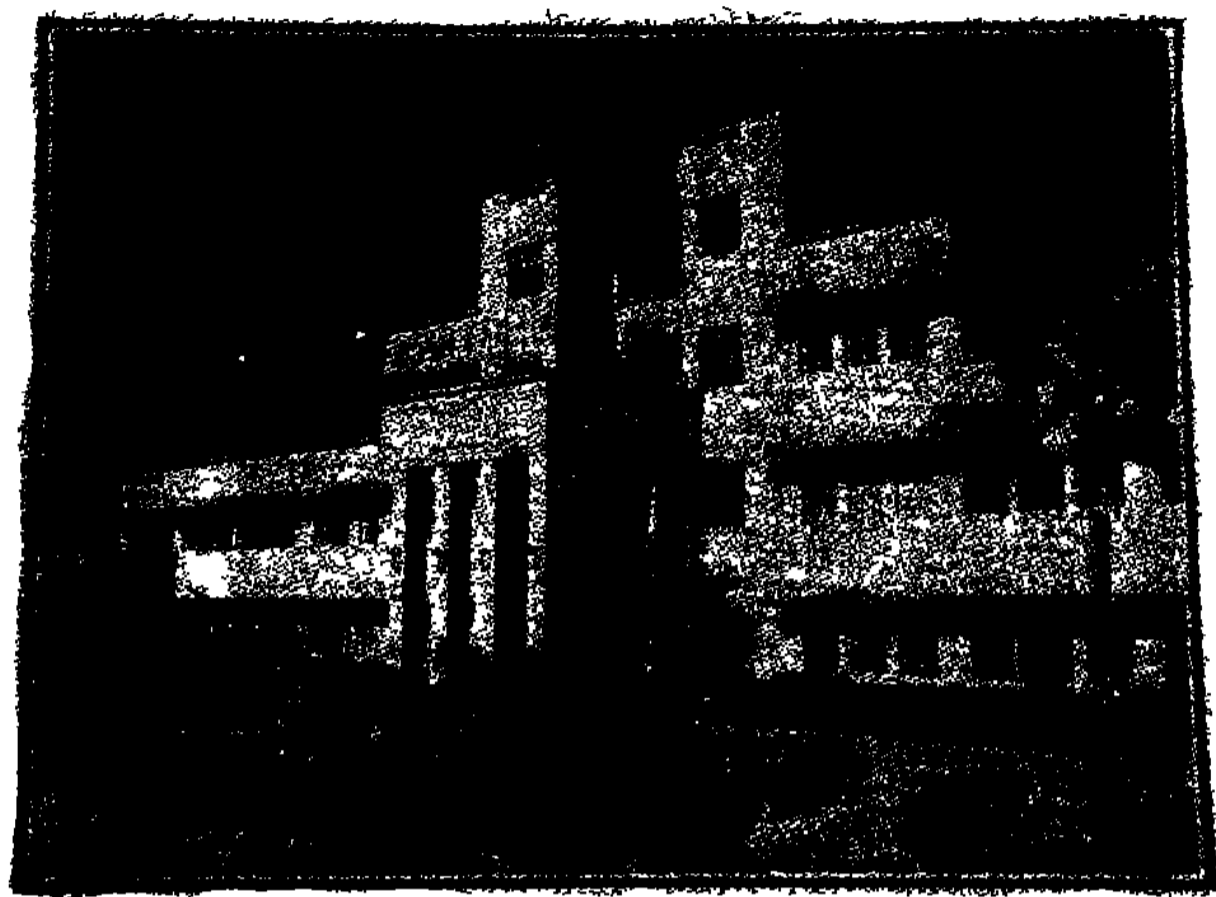
Qualifications Essential: (I) As in item No 1(I) above (II) A doctoral degree in Veterinary Science/ Animal Science/Dairy Science with specialisation in Animal Genetics and Breeding (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Relative specialisation and relevant experience cognate to the job requirement in the field of Veterinary Science/ Animal Science/ Dairy Science with specialisation in Animal Genetics/Breeding

CENTRAL SOIL AND WATER CONSERVATION RESEARCH AND TRAINING INSTITUTE, DEHRADUN

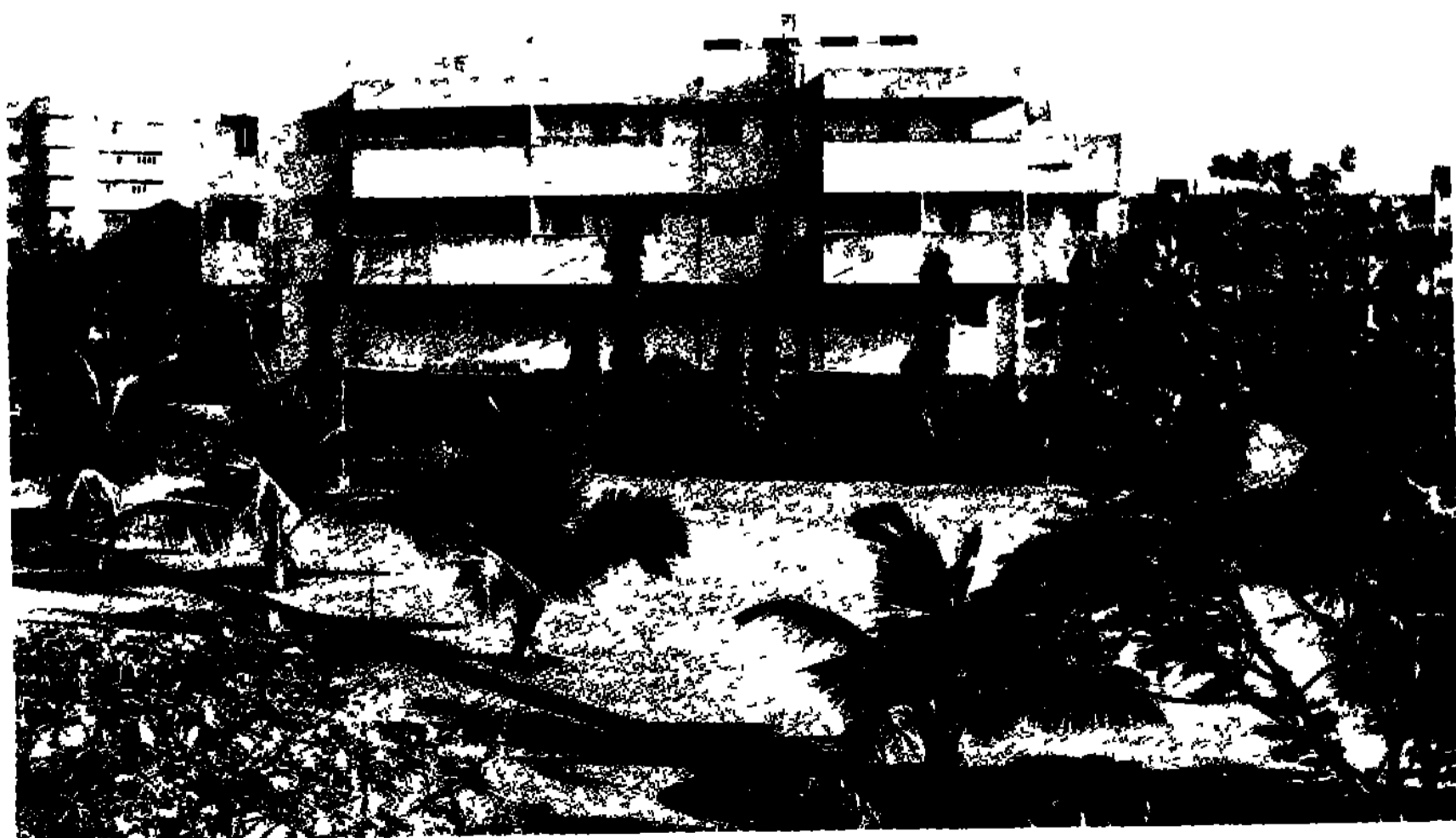
48. HEAD, DIVISION OF ENGINEERING (One Post)

Qualification Essential: (I) As in item No. 1(I) above (II) Good academic record with a doctoral degree in Soil and Water Conservation Engineering (III) As in item No 6(III) above (iv) As in item No 1(iv) above (v) Relative specialisation and relevant experience cognate to job requirement under essential qualifications as - (i) Experience in Soil & Water Conservation Engineering on Watershed basis (II) Knowledge in modern methods and of techniques for Irrigation in Watershed management. (III) Knowledge in Russian/German/French

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